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East Europe Report

ECONOMIC AND INDUSTRIAL AFFAIRS

No. 2344

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EFFECTIVENESS OF SCIENCE, TECHNOLOGY IN AGRICULTURE ANALYZED

Prague STATISTIKA in Czech No 8, 1982 pp 343-358

[Article by Vaclav Houska: "On the Problems of Measuring the Effectiveness of Scientific-Technical Development in Czechoslovak Agriculture"]

[Text] Despite the fact that the role of VTR [scientific-technical development] in the development of society and the economy has been unambiguously defined in Marxist political economy, techniques for measuring the efficiency of VTR and its contributions to an increase in utility and economic effectiveness have not as yet been satisfactorily developed. This is the case because VTR is a factor, in varying degrees of intensity, in all aspects of public activities, in both the inputs and outputs of production processes, and is an element in the changing conditions of production processes, etc.[1]

In this article, I will present one of the possible techniques for the statistical quantification of VTR and its contributions to increased utility and economic effectiveness in agricultural sector applications. Here one is dealing with a sector[2] where, in addition to the usual VTR issues, the problem is complicated by the biological nature of production and the fact that the effectiveness of VTR is also influenced by natural conditions.[3] Simultaneously, I will call attention in this article to several pressing tasks for VTR in relation to future stages and will point out several additional approaches to an analysis of contemporary VTR tasks.

1. Methodology, System of Indicators and Analytical Approach

Our methodology stems from the fundamental goals and tasks of this sector, which primarily reflect a growing level of satisfaction of social needs (in both a quantitative and qualitative sense), changing labor productivity (thus creating leeway for a further reduction of the work force, under conditions of increasing production volume), and the requirement for increasing economic efficiency, as manifested in declining per unit labor and capital inputs and reduction in labor value added as a component of the value of production for a given year.

A population increase, structural changes in nutrition patterns, and efforts to increase self-sufficiency in agricultural raw materials for foodstuff production and in foodstuffs themselves, given limitations on use of the soil fund, have all posed, during recent development and will continue to pose for agriculture the task of increasing the yields of all crops and the usability of all livestock, i.e., to increase the utility of every hectare of agricultural land at the socially necessary rate.[4]

So that it will be possible at the same time to satisfy the growing demands of society in other areas (in conjunction with the implementation of the basic economic law of socialism), agriculture has been and continues to be faced with the no less significant requirement that this increase of production at the socially desirable rate, structure and quality be achieved without increasing the work force (and ideally while reducing the work force). This means that the desired increase in production has to be fully covered by increasing labor productivity, and that each production increase has to be achieved with the lowest possible amount of bound labor per unit of production. In other words, increased productivity of all labor must create leeway for an increase in food consumption, especially in the qualitative sense. This means assuring efficient agricultural development.

The fulfillment of these tasks has placed, and continues to place ever greater demands on VTR. Moreover, changing domestic and foreign conditions increase the demands on VTR performance and make it imperative that VTR be implemented in production and labor processes as intensively and on as wide a scale as possible. The impact of individual influences on achieved production volume has varied in specific time periods and this variability will continue to accompany future development. In order that the increase in utility and economic effectiveness be as widespread and as permanent as possible, it is not sufficient to create conditions only in certain of the above areas, but to create them in mutual harmony and on the broadest possible scale. This concept implies, for example, that increasing the biological capacities of crops and livestock will not be adequate in and of itself; it must be accompanied by a change in conditions, and ideally by the adaptation of conditions to the characteristics of crops and livestock, but in the requisite, broadest possible application to agricultural practice. Likewise, it is not solely a matter of assuring the required increase in per hectare yields, but also of assuring the introduction of technology which will make it possible to harvest the crops with minimal losses, etc.

The mutual interrelationships of the factors crucial for increasing the utility of each hectare of agricultural land and the economic efficiency of agriculture led to the choice of a methodology which reflects these interrelationships and makes it possible to consider changes in utility and economic efficiency as outcomes of the contributions of research, outcomes achieved by our own research base and within the framework of the international division of labor and cooperation. This concerns primarily biological, technicobiological, and organizational research results and, generally, research whose results are implemented either by the producers of capital equipment for agriculture or by the users of this capital equipment (i.e., in agriculture itself), and the results of research oriented to specific problems of agriculture, etc. This increased utility and effectiveness may also be considered as a consequence of the application of research results under the broadest possible practical conditions and as a consequence of changes in the mastery of research results by all participants in the labor process. The above methodology quantifies the efficiency and contribution of VTR at the stage "when science becomes a productive force." This definition does not imply that this methodology does not reflect broader and more general preconditions, which include, among the most important, the development of production relationships, social conditions, political conditions, the level of international and interbranch, division of labor, and the like.

The above initial considerations form the basis for the actual methodological approach. The objective is to quantify the dynamic of VTR effectiveness on increased utility in agriculture during specific time periods, as well as the change in the aggregate contribution of VTR in the form of production increases, changes in the structure of production, increased labor productivity, savings of all kinds of public labor and public labor costs in agriculture, given changing internal and external conditions (barriers to potential production increases, barriers to the necessary increase of certain factors of production--labor force, capital investment, etc., including changes in obtaining them). Further objectives include pointing out the changeability of those sectors with the most intensive influence of VTR, the influence of changing conditions on the economic effectiveness of VTR, and identifying those sectors where it will be essential to focus VTR efforts to achieve established goals in upcoming periods, etc.

The dynamic of VTR effectiveness may be quantified for specific years or periods,[5] either in relationship to a base period or to an average for the entire period being analyzed. This makes it possible to identify trends in VTR effectiveness in specific time periods (accelerating or decreasing). A change in VTR effectiveness has the result, among others, that a similarly demanding objective in a future period is achieved, in the event of positive changes, over a shorter time period than in the preceding period, or vice versa if VTR effectiveness has declined.

The methodology described above will be applied to the 1951-1980 time period and to its individual periods, even though 15, 10, or even 5 years could be considered an adequate base period for comparison, as well as to the period of the Seventh Five-Year Plan.[6]

The actual analytical technique seeks, within the framework of the methodological approach defined above, a quantitative expression of VTR contributions in the form of production increases, labor productivity increases, labor force and public labor savings. The comparison is conducted both in relationship to the average level for the period being analyzed and in relation to average trends (actual, planned, desired) for this same period. The analytical technique, moreover, will proceed to calculate VTR contributions over specific time periods in terms of the number of years saved (calculated as the difference between the normal period and the average, planned, or desirable trend). This approach may be applied in wider connections such as in planning or projecting activities. it makes it possible to evaluate the ways in which VTR may contribute, in specific sectors, to a reduction in the time necessary to achieve assigned objectives. The quantification of VTR contributions in the above areas is conducted both in natural units (where actual data sources are available), in valued-natural units, i.e., constant prices and, furthermore, in current prices which represent the actual conditions for a given sector.

VTR contributions expressed as natural units, valued-natural units and in current prices differ. This difference reflects both improving or worsening conditions for the sector in question (such as price changes resulting from changes in prices of imports) and increasing or declining state assistance to a given sector, etc.

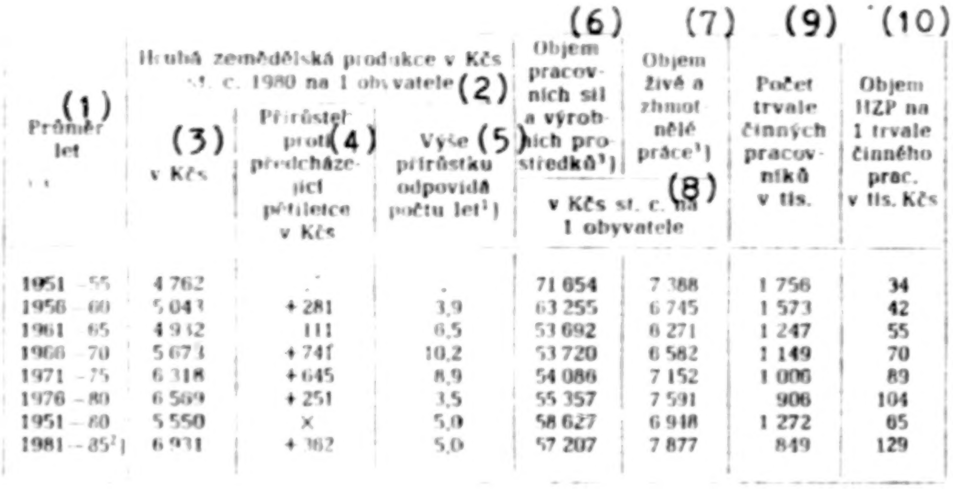
A comparison of the dynamic of VTR efficiency expressed in natural units, valued-natural units and in current prices makes it further possible to analyze the leeway created by the change in natural VTR effectiveness for an increase in compensation for work, or for price measures in the area of inputs, without unfavorable consequences for the economy of the sector, etc. VTR efficiency and its contribution is quantified through use of available statistical indicators.

In this article, the description of agricultural production results are based on indicators of gross agricultural, gross livestock, and gross plant production expressed in constant prices, because these figures are accessible at all levels of management, and these same figures recalculated on a per hectare, per capita and per employee basis. The authors are aware that these indicators do not reflect adequately one of the results of VTR (which, without a doubt, is the level of satisfaction of social needs in the area of nutrition), or the changing role of international exchange (imports) in assuring the nutritional needs of the population, or the production requirements of agricultural enterprises (e.g., fodder imports). To get an idea of the contribution of VTR in the area of the satisfaction of needs, one may use the volume of food consumed on the basis of domestic raw materials indicator, expressed in nutritional units. At the workplace of the authors, this indicator has been approved for further use at the central level and a comparison conducted with other indicators which have been used previously. The results showed that to satisfy the same quantitative requirements, albeit in a qualitatively different structure (e.g., with greater representation of animal protein) an ever-greater volume of HZP [Gross Agricultural Product] is necessary (the difficulty and complexity of this quantification is beyond the scope of this article and is not included in any of the working quantifications of this article). The dynamic of labor productivity is characterized in this article by use of the indicator of gross agricultural production per worker active in agriculture, while the dynamic of economic efficiency is evaluated by using either the indicator of HZP per volume of factors of production (labor force and capital stock) or the indicator of volume of embodied and capitalized labor (which includes the yearly volume of wages and bonuses for work in a given year and consumed and depreciated production assets), expressed both in constant and in current prices and related to the volume of agricultural production.

2. Quantification Results and Their Interpretation

Table 1 shows how intensively VTR has contributed to production increases and under what conditions this task has been fulfilled. Over 30 years of development, the average increase in gross agricultural production volume per capita amounted to 0.94 percent. In only 11 years there were declines. The average trend, expressed as an annual average increase for the entire period being analyzed, was exceeded in three 5-year plans. The largest increases

Table 1. Development of Per Capita Gross Agricultural Production Volume and Factor of Production[4] Volume in Agriculture; Development of Number of Employees and Labor Productivity in Agriculture



(1) Průměr let	Hrubá zemědělská produkce v Kčs st. c. 1980 na 1 obyvatele (2)			(6) Objem pracovních sil a výrobních prostředků[3])	(7) Objem živé a zhmotnělé práce[3])	(9) Počet trvale činných pracovníků v tis.	(10) Objem HZP na 1 trvale činného prac. v tis. Kčs
	(3) v Kčs	(4) Přírůstek proti předcházející pětiletce v Kčs	(5) Výše přírůstku odpovídá počtu let[1])	(8) v Kčs st. c. na 1 obyvatele			
1951–55	4 762	.	.	71 654	7 388	1 756	34
1956–60	5 043	+ 281	3,9	63 255	6 745	1 573	42
1961–65	4 932	111	6,5	53 692	6 271	1 247	55
1966–70	5 673	+ 741	10,2	53 720	6 582	1 149	70
1971–75	6 318	+ 645	8,9	54 086	7 152	1 006	89
1976–80	6 569	+ 251	3,5	55 357	7 591	906	104
1951–80	5 550	×	5,0	58 627	6 948	1 272	65
1981–85[2])	6 931	+ 362	5,0	57 207	7 877	849	129

Notes: 1. From average annual increase for entire period being analyzed.

2. Calculation of the author

3. The constant prices for labor force and capital asset volume and for labor value added and capitalized labor volume are understood to be (in subsequent tables as well) constant 1977 prices for capital assets and capitalized labor; as constant 1976 prices for labor force and labor value added. Labor force volume is a calculated quantity based on number of employees, average annual compensation and projected future operating time. Labor value added volume includes the volume of wages and work bonuses.

4. On the quantitative side of the production process, this concerns the labor force and capital stock (factors participating in the work process; on the qualitative side of the production process, this concerns labor value added and capitalized labor (labor expended, consumed and depreciated capital assets) in a given year. These are the factors entering into the value of production.

Key:

(1) Yearly average
(2) Gross per capita agricultural production in constant 1980 koruna prices
(3) in korunas
(4) koruna increase over previous 5-year period
(5) Number of years at average annual increase to equal amount of increase[1]
(6) Volume of labor force and capital assets[3]
(7) Volume of labor value added and capitalized labor[3]
(8) In constant price korunas per capita
(9) Number of permanently active workers (in thousands)
(10) Volume of HZP per permanently active worker.

were achieved in the 1966-1970 and 1971-1975 5-year plans. During the Sixth Five-Year Plan the amount of this increase was under the magnitude of the average increase for the entire period being analyzed. This came about due to a slowing down in the growth rate of production combined with a speeding up of the population growth rate. The contribution of VTR, expressed as a production increase, therefore declined gradually.

The growth in agricultural production established by the guidelines of the 16th CPCZ congress will assure the coverage of increasing consumption by a larger population, an increased degree of self-sufficiency, and create the conditions for qualitative structural changes in nutrition. For the Seventh Five-Year Plan, an increase in per capita production has been projected which is greater than that achieved in the Sixth Five-Year Plan and greater than the average annual increase recorded for the entire period being analyzed.

Other parts of Table 1 indicate that an increase in per capita production was achieved with a decreasing per capita volume of factors of production, especially during the first four 5-year plans. This also occurred in conjunction with the restructuring of small-scale agricultural production to socialist mass-production agriculture, and was accompanied by the intensive application of VTR in agricultural practice. In the last two 5-year plans, the per capita volume of factors of production has shown a rising trend related to the implementation of structural changes in nutrition patterns and ongoing changes in the structure of factors of production (a further increase in the qualitative aspects of the work force--increased qualifications, an improved age structure of the work force, etc.), and this trend will continue into the Seventh Five-Year Plan. Since increased production volume has been achieved given declining numbers of agricultural workers, this means that the entire increase in production has been assured by labor productivity increases.

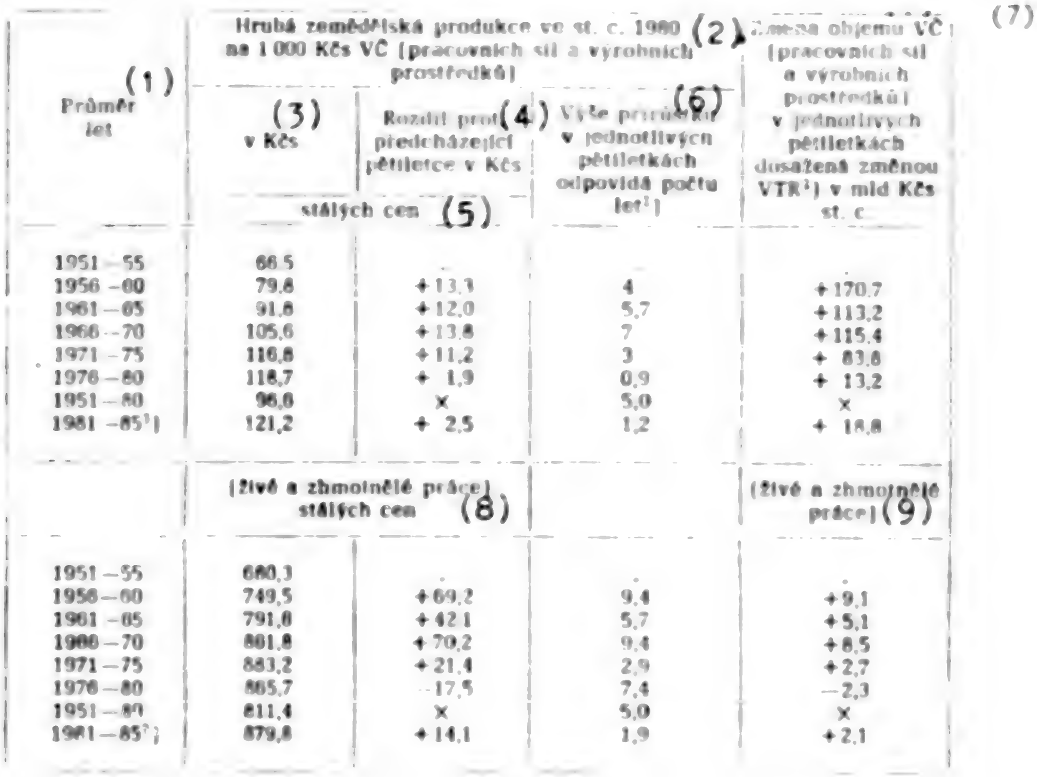
An aggregate view of the dynamic of VTR effectiveness and its contribution to economic efficiency in specific time periods is provided by Table 2 and Graph 1.

From part a) of Table 2 it follows that it took 15 years to exceed the average level of the 1951-1980 period. The change in VTR effectiveness was greatest in the 1961-1965 and the 1966-1970 5-year plans; there was a decline in the efficiency dynamic during the 1971-1975 period, and during the Sixth Five-Year Plan this dynamic lagged substantially behind the average for the entire period under analysis (1951-1980). The objective for the 1981-1985 period assumes a lower increase in VTR than the annual average for the 1951-1980 period. Changes in VTR efficiency in specific time periods brought the greatest labor savings during the stage of the restructuring of small-scale agricultural production to socialist mass production (the greatest contribution was achieved in the 1956-1960, 1961-1965 and 1966-1970 5-year plans and the lowest during the 1976-1980 plan).

Changes in VTR efficiency in specific 5-year plans (a calculation always made during the subsequent 5-year plan, assuming an efficiency of production factors at the level of the preceding 5-year plan and a projection of production increses) have become evident through savings in labor force and capital asset volume for an achieved production volume expressed in constant prices. This was most evident in the 1961-1965 period (in the amount of Kcs 113 billion), and in the

Table 2. Efficiency Dynamic of VTR in Specific Time Periods and VTR Contributions to Czechoslovak Agricultural Efficiency

Part a) Natural Efficiency



Průměr let (1)	Hrubá zemědělská produkce ve st. c. 1980 na 1 000 Kčs VČ (pracovních sil a výrobních prostředků) (2)			Změna objemu VČ (pracovních sil a výrobních prostředků) v jednotlivých pětiletkách dosažená změnou VTR[1]) v mld Kčs st. c. (7)
	v Kčs (3)	Rozdíl proti předcházející pětiletce v Kčs (4)	Výše přírůstku v jednotlivých pětiletkách odpovídá počtu let[1]) (6)	
	stálých cen (5)			
1951–55	66,5	.	.	.
1956–60	79,8	+13,3	4	+170,7
1961–65	91,8	+12,0	5,7	+113,2
1966–70	105,6	+13,8	7	+115,4
1971–75	116,8	+11,2	3	+ 83,8
1976–80	118,7	+ 1,9	0,9	+ 13,2
1951–80	96,6	×	5,0	×
1981–85[1])	121,2	+ 2,5	1,2	+ 18,8
	(živé a zhmotnělé práce) stálých cen (8)			(živé a zhmotnělé práce) (9)
1951–55	680,3	.	.	.
1956–60	749,5	+69,2	9,4	+9,1
1961–65	791,6	+42,1	5,7	+5,1
1966–70	861,8	+70,2	9,4	+8,5
1971–75	883,2	+21,4	2,9	+2,7
1976–80	865,7	−17,5	7,4	−2,3
1951–80	811,4	×	5,0	×
1981–85[1])	879,8	+14,1	1,9	+2,1

Key:

(1) Yearly average

(2) gross agricultural production in constant 1980 prices per Kcs 1,000 of factors of production (labor force and capital assets)

(3) in korunas

(4) koruna difference compared to previous 5-year plan

(5) constant prices

(6) number of years corresponding to increase in given 5-year plan

(7) change in volume of factors of production (labor force and capital assets) in specific 5-year plan achieved by change in VTR,[2] in billions of constant price korunas

(8) labor value added and capitalized labor, constant prices

(9) labor value added and capitalized labor

Part b) Efficiency Under Actual Economic Conditions

	Hrubá zemědělská produkce ve st. c. na 1 000 Kčs VČ (pracovních sil a výrobních prostředků) (1)			(6) Změna v objemu VČ (pracovních sil a výrobních prostředků) v jednotlivých pětiletkách dosažená změnou účinnosti VTR²) v mld Kčs běžných cen
	(2) v Kčs	Rozdíl proti (3) předcházející pětiletce v Kčs	(5) Výše přírůstku v jednotlivých pětiletkách odpovídá počtu let¹)	
	běžných cen (4)			
1951–55	245,1	.	.	.
1956–60	198,8	−46,3	9,7	− 63,3
1961–65	182,4	−14,4	2,9	− 29,6
1966–70	147,7	−34,7	6,9	−105,5
1971–75	131,6	−16,1	3,2	− 75,2
1976–80	120,0	−11,6	2,3	− 58,5
1951–80	170,9	x	5,0	x
1981–85	.	.	.	.
	(živé a zhmotnělé práce) (7)			(živé a zhmotnělé práce) (8)
1951–55	1 887	.	.	.
1956–60	1 455	−432	10,9	− 10,1
1961–65	1 263	−192	4,6	− 7,4
1966–70	1 000	−263	6,6	− 11,9
1971–75	945	− 55	1,4	− 11,2
1976–80	892	− 53	1,3	− 6,1
1951–80	1 240	x	5,0	x
1981–85		.	.	

Notes: 1. Based on the annual average for the entire period being analzyed.

2. For calculations in specific 5-year plans, efficiency is always considered to be at the level of the preceding 5-year plan.

3. Calculation of the author

Key:

(1) gross agricultural production in constant prices per Kcs 1,000 of factors of produciton (labor force and capital assets)

(2) in korunas

(3) difference compared to preceding 5-year plan (korunas)

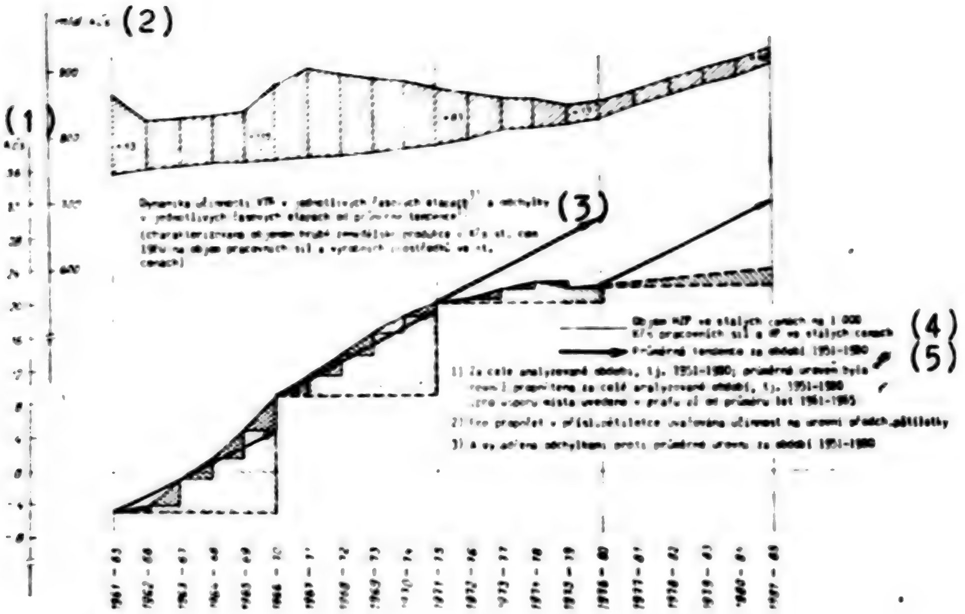
(4) current prices

(5) number of years corresponding to increase in given 5-year plan¹

(6) change in production factor volume (labor force and capital assets) in individual 5-year plans achieved by change in VTR² efficiency, in billions of current price korunas

(7) labor value added and capitalized labor

(8) labor value added and capitalized labor



Graph 1. Absolute Contributions of VTR in Specific Time Periods (Expressed as Savings of Labor Force and Capital Asset Volume in Constant Prices) Caused by Change in Production Factor Efficiency^{2}

Key:

(1) korunas

(2) billions of korunas

(3) dynamic of VTR efficiency in specific time periods^{3} and (expressed deviations from the average in specific time periods.^{1} (expressed as volume of gross agricultural production in constant 1980 koruna prices per labor force and capital asset volume in constant prices).

(4) HZP volume in constant prices per Kcs 1,000 of labor force and capital assets in constant prices.

(5) average for period 1951-1980

Notes:

1. For the entire period under analysis, i.e., 1951-1980; the average level was likewise calculated for the entire period under analysis, i.e., 1951-1980. In order to save space, graph shows only results beginning with 1961-1965 period.
2. For calculations in specific 5-year plans, efficiency is considered to be at the level of the previous 5-year plan.
3. Expressed as deviations compared with the average level for 1951-1980 period.

1966-1970 period (in the amount of Kcs 15 billion). Labor force and capital asset savings amounted to Kcs 84 billion in the 1971-1975 5-year plan, and only Kcs 13 billion in the Sixth 5-Year Plan. For the 1981-1985 plan, savings in labor force and capital asset volume are projected to be Kcs 19 billion. The achieved savings in production factors have resulted from the intensive substitution of capital for labor and of changes in the efficiency of those factors of production fostering intensification.

Part a) of Table 2 indicates that the average level for 1951-1980 was exceeded only in 1960; that the greatest change in efficiency occurred in the 1961-1965 5-year plan; that VTR efficiency slowed down during the 1966-1970 and 1971-1975 periods; and that in the Sixth Five-Year Plan it even declined. The target for the Seventh Five-Year Plan assumes a change in the trend of the Sixth Five-Year Plan, but projects a lesser increase in efficiency than was achieved in preceding periods.

A change in VTR efficiency in specific 5-year plans (a calculation always performed during the succeeding 5-year plan assuming an efficiency of the production factors at the level of the preceding 5-year plan and a project of production increases) was manifested by a saving of labor value added and capitalized labor in the 1956-1960 period in the amount of Kcs 9.1 billion, in 1961-1965 in the amount of Kcs 5.1 billion, in 1966-1970 in the amount of Kcs 8.5 billion, in the 1971-1975 5-year plan in the amount of Kcs 2.7 billion. In the Sixth Five-Year Plan there was a decrease. The objective for the Seventh Five-Year Plan assumes a change in the efficiency of labor value added and capitalized labor and a contribution of Kcs 2.1 billion to overall efficiency.

Part b) of Table 2 presents different trends from the trends of natural efficiency described above. It primarily reflects, moreover, the changing participation of the state in the development of agricultural production, the changing internal and external conditions for the assurance of capital assets for agriculture, a change in the social costs of providing capital assets to agriculture, an increase in wages and bonuses for agricultural work, etc. From a comparison of the data in parts a) and b) of Table 2, it is furthermore clear that the dynamic of natural VTR efficiency created, in all time periods with the exception of the Sixth Five-Year Plan, leeway for wage measures, price measures, and the like, in other words, that VTR proceeded without unfavorable influences on the economics of the sector or cost increases.

To evaluate which areas are subject to the greatest and the least influence of VTR in efforts to increase the utility of agriculture, it is necessary gradually to subject to analysis individual sectors of agricultural production. A simple comparison of the results achieved in agricultural production as a whole with that of plant and of livestock production point to certain differences. The same is true from the point of view of the long-term tasks in these two sectors (Table 3).

The main objective for 1981-1985 is to increase substantially the volume of plant production with the objectives of increasing self-sufficiency in plant products and creating the conditions for the further development of livestock

Table 3. Development of Volume of Agricultural Production in Millions of Korunas at Standard 1980 Prices

Průměr let (1)	Objem zemědělské produkce (2)			Přírůstek objemu produkce proti předch. období (7)			Výše přírůstku odpovídá počtu let¹) (12)		
	celkem (3)	v tom (4)		celkem (8)	v tom (9)		HZP (13)	v tom (14)	
		rostl. (5)	živoč. (6)		rostl. (10)	živoč. (11)		rostl. (15)	živoč. (16)
	mil Kčs st. c. 1980 (17)								
1961 - 65	68 859	32 574	36 285	+ 1 203	- 1 337	+ 2 540	0,7	8,5	2,0
1966 - 70	81 307	37 820	43 487	+ 12 448	+ 5 246	+ 7 202	8,1	13,8	6,3
1971 - 75	92 143	39 959	52 184	+ 10 836	+ 2 139	+ 8 697	7,1	5,6	7,5
1976 - 80	99 403	41 792	57 611	+ 7 280	+ 1 833	+ 5 427	4,7	4,8	4,7
Směrnice²) XVI. sjezdu KSČ (18) 1981 - 85	109 343	47 643 - 48 479	61 700 - 60 864	+ 9 940	+ 5 851 - + 6 687	+ 4 089 - + 3 253	6,5	15,4 - 17,6	3,8 - 2,8
Index úkolů Směrnice v % Ø 1976 - 1980 (19)	110	114 - 116	107,1 - 105,6						

Notes:
1. From the average for the entire period under analysis
2. Expressed at 1980 price levels

Key:

(1)	yearly average	(12)	number of years at average increase corresponding to amount of increase¹
(2)	volume of agricultural production	(13)	HZP
(3)	total	(14)	composed of
(4)	composed of	(15)	plant
(5)	plant	(16)	livestock
(6)	livestock	(17)	millions of korunas at constant 1980 prices
(7)	increase in production volume compared to previous period	(18)	16th CPCZ congress guidelines² for 1981-1985
(8)	total	(19)	index of guidelines tasks in percentages of 1976-1980
(9)	composed of		
(10)	plant		
(11)	livestock		

production on the basis of domestic fodder sources. This implies stopping the growing disproportion between plant and livestock production (Table 4). Efforts are to be concentrated on critical areas of plant production (Table 5).

From Table 5 it follows that differing magnitudes of increases in per hectare yields for individual crops were the primary factor working against the trend of more rapid increases in the volume of plant production. Extensive structural changes in sown land (an expansion of land sown with crops producing lower levels of nutrients per hectare at the expense of land sown with crops with higher levels of nutrient production per hectare) have also exerted a negative effect, as have a decrease in crop land and production resulting from lower allocations of agricultural land.

Table 4. Development of Volume of Gross Plant Production in Korunas at 1980 Standard Prices per Kcs 1,000 Gross Livestock Production at 1980 Standard Koruna Prices

Průměr let (1)	Objem hrubé rostlinné produkce v Kčs na 1 000 Kčs hrubé živočišné produkce (2)	Přírůstek objemu hrubé rostlinné produkce v Kčs na přírůstek 1 000 Kčs hrubé živočišné produkce (3)	Rozdíl v objemu hrubé rostlinné produkce proti objemu hrubé živočišné produkce v mil. Kčs (4)	Rozdíl v přírůstku objemu hrubé rostlinné produkce na přírůstek hrubé živočišné produkce v mil. Kčs (5)
1961–65	897,7	.	– 3 711	–3 877
1966–70	869,7	728.4	– 5 667	–1 956
1971–75	765,7	245.9	–12 225	–6 558
1976–80	725,4	[illegible]37,8	–15 819	–3 594
Směrnice XVI. sjezdu KSČ (6)				
1981–85	772,2 – 798,5	1 430,9 – 2 055,6	–14 057 – –12 385	+1 762 – +3 434

Key:
(1) yearly average
(2) volume of gross plant production in korunas per Kcs 1,000 of gross livestock production
(3) increase in volume of gross plant production in Kcs per increase in Kcs 1,000 of gross livestock production
(4) difference in volume of gross plant production compared to volume of gross livestock production, in millions of korunas
(5) difference in increase in volume of gross plant production per increase in gross livestock production, in millions of korunas
(6) 16th CPCZ congress guidelines

Table 5. Plant Production Tasks for 1981-1985 With View to Long Range Trends (in millions of korunas at standard 1980 prices)

Průměr let (1)	Objem hrubé rostlinné produkce v mil. Kčs (2)		Rozdíl (vliv změny struktury a ploch) (5)	v tom vliv (6)		Skutečný přírůstek objemu hrubé rostlinné produkce (9)	Přírůstek v důsledku změny intenzity (10)
	skut. (3)	Při plochách plodin jako v předch. 5letém období (4)		ploch (7)	struktury (8)		
a	1	2	3 = (1 – 2)	4	5	6	7 = (6 + 3)
1961–65	32 574	32 574	×	×	×	+1 337	.
1966–70	37 820	39 789	– 1 969	–546	–1 423	+5 246	+7 215
1971–75	39 959	40 697	– 738	–416	– 322	+2 139	+2 877
1976–80	41 792	43 237	– 1 445	–714	– 731	+1 833	+3 278
Směrnice XVI. sjezdu KSČ (11)							
1981–85	47 643 – 48 479		+1 635 – + 971	–887 – –675	+2 322 – +1 646	+6 687 – +5 851	+5 052 +4 880

Key:
(1) yearly average
(2) volume of gross plant production in millions of korunas
(3) actual
(4) with crops planted on same land as in previous 5-year plan

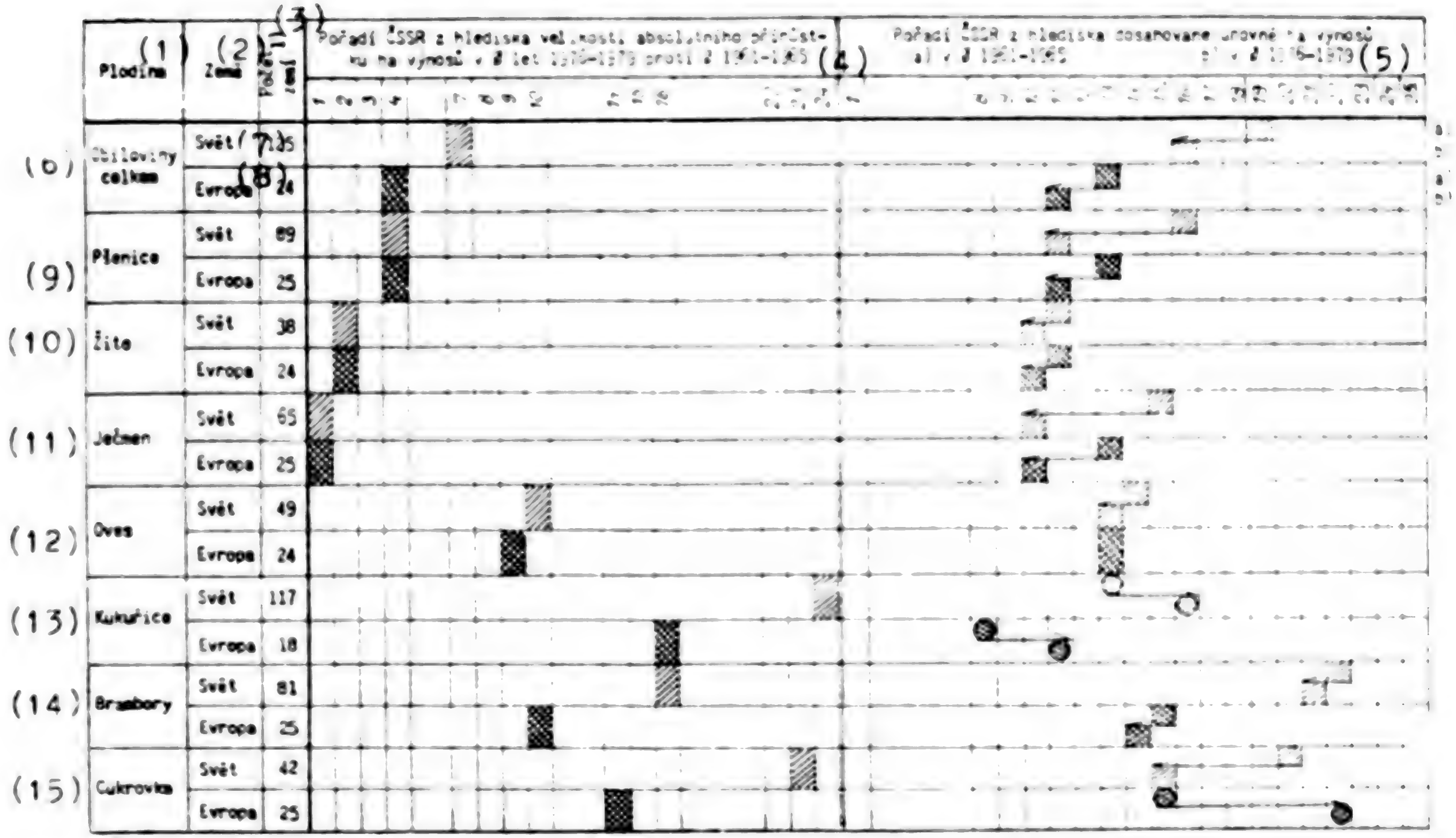
[key continued next page]

[Continued Key to Table 5]

(5) difference (influence of changes in structure and land use)
(6) composed of the influences of
(7) land use
(8) structure
(9) actual increase in volume of gross plant production
(10) increase as result of changes in intensity
(11) 16th CPCZ congress guidelines

The task specifically assigned to individual sectors of plant production of increasing the harvest in the years of the Seventh Five-Year Plan compared to the 1976-1980 period, represents an average increase in production volume for the crops affected of 11.7 to 12.1 percent. Grain harvests are to increase 9 percent annually, those of bulk fodder by 13-14 percent, of root crops by 50 percent, of sugar beets by 12-15 percent, and of hops by 20 percent. In order to meet the target for the overall volume of plant production, it would be necessary to increase the volume of production of the remaining crops by an average of 17.3 to 21.5 percent. This implies two concurrent conclusions related to VTR. The first conclusion is that VTR must be concentrated on increasing the per hectare yields of all agricultural crops, even of those which in terms of area sown are less significant. The second and concurrent conclusion is that the assurance of these tasks also requires an intensification of the structure of plant production, in the specific sense proposed at the Fourth Plenum of the CPCZ Central Committee, namely, the replacement of the extensive development of plant production with intensive development.

An analysis of per hectare yields over the past 20 years for all crops shows an increase in per hectare yields for a number of crops of a magnitude which ranks the CSSR first in Europe and worldwide as well (Graph 2). On the other hand, an analysis of the role played by specific crops in the dynamic of plant production in the past 20 years indicates that for a number of crops the absolute and the relative increase in per hectare yields lagged behind the magnitude of the average increase in the volume of plant production per hectare. The hectare yields of certain crops even showed a decreasing trend. (Table 6) Moreover, a space analysis of per hectare yield increases for selected crops shows a substantial differentiation in the magnitude of increases in per hectare yields (Table 7). Based on these long-term trends, a view of the tasks of the current period points, on the one hand, to the difficulty of these tasks but also, as tables 6 and 7 indicate, to significant underutilized capacity for a number of crops (declining or stagnating increases in per hectare yields, great differentiation in the achieved increases of per hectare yields within the spatial structure of the same crop, as well as to the possibility for and the necessity of contributing to an increase in plant production by means of structural changes). Calculations indicate that between 1981 and 1985 it will be necessary to achieve a level of participation of structural changes in increases in the volume of gross plant production on the order of 28.1-34.7 percent. These include the gradual phasing out of certain crops which provide greater per hectare nutrient production and their replacement with crops with lower per hectare production levels, and using what has often in the past been a transitional solution, such as cutting back on the working of high ground due to the great difficulties involved in raising the relevant crops.



[1] Pěstujících příslušnou plodinu

Graph 2. Comparison of Level and Dynamic of Hectare Yields in CSSR With Countries of the World and of Europe

Key:

(1) crop
(2) country
(3) number of countries[1]
(4) rank of CSSR in terms of magnitude of absolute increase of per hectare yields in 1976-1979 compared with 1961-1965
(5) Rank of CSSR in terms of per hectare yield levels; a) 1961-1965 b) 1976-1979
(6) Grains overall
(7) world
(8) Europe
(9) wheat
(10) rye
(11) barley
(12) oats
(13) corn
(14) potatoes
(15) sugar beets

Notes: 1. countries growing each crop

Table [illegible]. Overview of Role of Specific Crops in Plant Production Increases (1976-1980 in comparison with 1961-1965 average)

Crops for which the absolute increase in production per hectare, in constant 1967 prices, for the 1976-1980 period was higher than the increase in gross plant production per hectare of agricultural land in 1976-1980 period, in constant 1967 prices, and compared with the 1961-1965 average.

Crop rank in terms of magnitude of increase	Crop	Hectare area harvested, 1976-80
[illegible]	grapes	34,340
[illegible]	hops	10,823
[illegible]	potatoes (not including early)	204,452
[illegible]	sown peas	15,484
[illegible]	winter rape and rape	71,579
[illegible]	hemp stalks	1,668
[illegible]	tobacco	3,495
[illegible]	winter wheat	1,158,220
[illegible]	grain corn	160,790
[illegible]	winter barley	31,902
[illegible]	spring barley	875,874
[illegible]	spring wheat	63,194
[illegible]	mustard	3,938
Harvested area for crops 1-13		2,635,759
Harvested area for crops 1-13 as percentage of total area harvested		62.6
Per hectare production of crops 1-13 in korunas, constant 1967 prices		7,609

Crops for which the relative increase in per hectare production (expressed in natural units) for the 1976-1980 period was greater than the relative per hectare increase in gross plant production in constant 1967 prices, compared with the 1961-1965 average.

Crop rank in terms of magnitude of increase	Crop	Hectare area harvested, 1976-80
1.	grapes	34,340
16.	potatoes	204,452
17.	sown peas	15,484
10.	winter rape and rape	71,579
5.	winter wheat	1,158,220
3.	grain corn	160,790
2.	winter barley	31,902
7.	spring barley	875,874
14.	spring wheat	63,194
4.	mustard	3,938
6.	occasional meadow cuttings	138,385
8.	double-edged red clover	179,641
9.	oats, including oat and barley mixtures	142,947
11.	lentils	1,369
12.	corn and its mixtures for vegetables and silage	483,899
13.	winter and spring rye	184,803
15.	alfalfa	206,728
Harvested area for crops 1-17		3,957,539
Harvested area for crops 1-17 as percentage of total area harvested		63.6
Per hectare production of crops 1-17 in korunas, constant 1967 prices		5,870

Crops for which the absolute increase in per hectare production, in constant 1967 prices, for the 1976-1980 period was lower than the increase in gross plant production per hectare of agricultural land for the 1976-1980 period, expressed in constant 1967 prices and compared to the 1961-1965 average.

Crop rank in terms of magnitude of increase	Crop	Hectare area harvested, 1967-80
[illegible]	oats, including oat and barley mixture	142,947
[illegible]	sugar beets	213,342
[illegible]	winter and spring rye	184,803
[illegible]	sunflowers to ripen	12,359
[illegible]	early potatoes	15,956
[illegible]	fodder beets and turnips	18,593
[illegible]	edible beans	3,410
[illegible]	double-edged red clover	179,641
[illegible]	chicory	1,250
[illegible]	alfalfa	206,728
[illegible]	occasional meadow cuttings	138,385
[illegible]	clover and alfalfa hay	163,317
[illegible]	other fodder root crops	354
[illegible]	corn and its mixtures for vegetables and silage	483,899

Crops for which the relative increase in production per hectare (expressed in natural units) for the 1976-1980 period was less than the relative per hectare increase in gross plant production in constant 1967 prices, compared with the 1961-1985 average.

Crop rank in terms of magnitude of increase	Crop	Hectare area harvested, 1976-80
29.	sugar beet	213,342
26.	sunflowers to ripen	12,359
30.	early potatoes	15,956
23.	fodder beets and turnips	18,593
32.	edible beans	3,410
33.	chicory	1,250
18.	clover and alfalfa hay	163,317
20.	other fodder root crops	354
24.	flax seed	31,25[illegible]
28.	fodder peas and beans	12,049
21.	permanent meadows	791,[illegible]
31.	fodder cabbage	9,22[illegible]
25.	spring legume mixtures	167,026
19.	pastures	759,394
35.	legumes and legume mixtures	2,91[illegible]
36.	seed beans	41,[illegible]

(table continued)

[continuation of Table 5]

Crop rank in terms of magnitude of increase	Crop	Hectare area harvested, 1967-80
28.	flax seed	31,252
29.	fodder peas and peluska	12,048
30.	lentils	1,363
31.	permanent meadows	781,507
32.	fodder cabbage	8,220
33.	spring legume mixtures	167,026
34.	pastures	759,894
35.	legume mixtures	2,617
36.	seed beans	41,894
Harvested area for crops 14-36		3,570,805
Harvested area for crops 14-36 as percentage of total area harvested		57.1
Per hectare production of crops 14-36 in korunas, constant 1967 prices		2,419

Crop rank in terms of magnitude of increase	Crop	Hectare area harvested, 1976-80
22.	hemp stalks	1,668
27.	hops	10,823
34.	tobacco	3,495
Harvested area for crops 18-36		2,249,025
Harvested area for crops 18-36 as percentage of total area harvested		35.7
Per hectare production of crops 18-36 in korunas, constant 1967 prices		2,427

Crops for which there was a decrease in production per hectare, in constant 1967 prices, during the 1976-1980 period, and compared with 1961-1965 average.

Crop ranking	Crop	Harvested area
37.	flax stalks	31,252
38.	feed legumes	1,946
39.	poppy seed	10,796
40.	other grains	1,011
41.	other fodder legumes	364
42.	hemp seed	269
Harvested area for crops 37-42		45,638
Harvested area for crops 37-42 as percentage of total area harvested		0.7
Per hectare production of crops 37-42 in korunas, constant 1967 prices		7,239
Harvested area for crops in groups I-III		6,252,202
Per hectare production of crops in groups I-III, constant 1967 prices		4,643

Crops for which there was a decrease in production per hectare during 1976-1980 period, in comparison with 1961-1965.

Crop ranking	Crop	Harvested area
37.	flax stalks	31,252
38.	feed legumes	1,946
39.	poppy seed	10,796
40.	other grains	1,011
41.	other fodder legumes	384
42.	hemp seed	269
Harvested area for crops 37-42		45,638
Harvested area for crops 37-42 as percentage of total area harvested		0.7
Per hectare production of crops 37-42 in korunas, constant 1967 prices		7,239
Harvested area for crops in groups I-III		6,252,202
Per hectare production of crops in groups I-III, constant 1967 prices		4,643

Table 7. District Classification According to Initial Level of Per Hectare Wheat Yields (1961-1965 average designated as initial level)

(1)

Územní kraj (2)	Počet okresů (3)	Hektorový výnos v q v průměru let (4)				Přírůstek ha výnosů v q za období (5)				Index Ø 1976–80 / Ø 1961–65 = 100 (6)
		1961–65	1966–70	1971–75	1976–80	1.	2.	3.	1.–3.	
ČSSR (7)	47	27,8	30,6	37,2	41,5	+2,8	+ 6,6	+4,3	+13,7	149,3
(8) ČSR	43	28,1	30,3	36,4	40,5	+2,2	+ 6,1	+4,1	+12,4	144,1
SSR (9)	4	25,3	34,4	45,7	51,7	+9,1	+11,3	+6,0	+26,4	204,3
(10) Středočeský	9	29,5	32,7	37,2	41,4	+3,2	+ 4,5	+4,2	+11,9	140,3
Jihočeský (11)	1	26,7	25,9	31,2	33,4	–0,8	+ 5,3	+2,2	+ 6,7	125,1
(12) Západočeský	5	26,5	28,2	34,6	34,7	+1,7	+ 6,4	+0,1	+ 8,2	130,9
Severočeský (13)	2	27,1	31,5	34,0	38,4	+4,4	+ 2,5	+4,4	+11,3	141,7
(14) Východočeský	8	28,4	29,9	36,3	40,4	+1,5	+ 6,4	+4,1	+12,0	142,3
Jihomoravský (15)	12	28,2	30,7	38,3	43,3	+2,5	+ 7,6	+5,0	+15,1	153,5
(16) Severomoravský	6	27,3	28,3	35,1	40,9	+1,0	+ 6,8	+5,8	+13,6	149,8
Západoslovenský (17)	4	25,3	34,4	45,7	51,7	+9,1	+11,3	+6,0	+26,4	204,3
(18) Středoslovenský	0	—	—	—	—	—	—	—	—	—
Východoslovenský (19)	0	—	—	—	—	—	—	—	—	—
b) Okresy s podprůměrnou výchozí úrovní ha výnosů (proti váženému průměru za ČSSR) (20)										
ČSSR	59	19,7	24,1	31,1	34,7	+4,4	+ 7,0	+3,6	+15,0	176,1
ČSR	31	21,6	24,2	30,4	32,6	+2,6	+ 6,2	+2,2	+11,0	150,9
SSR	28	18,2	24,8	31,8	36,8	+6,6	+ 7,0	+5,0	+18,6	202,2
Středočeský	3	23,4	26,3	33,6	33,9	+2,9	+ 7,3	+0,3	+10,5	144,9
Jihočeský	7	22,7	25,8	31,7	33,0	+3,1	+ 5,9	+1,3	+10,3	145,4
Západočeský	4	19,1	22,2	29,7	31,8	+3,1	+ 7,5	+2,1	+12,7	166,5
Severočeský	8	20,8	24,2	28,8	29,8	+3,4	+ 4,6	+1,0	+ 9,0	143,3
Východočeský	3	24,0	24,6	32,1	32,6	+0,6	+ 7,5	+0,5	+ 8,6	135,8
Jihomoravský	2	22,3	24,9	34,3	43,9	+2,6	+ 9,4	+9,6	+21,6	196,9
Severomoravský	4	20,3	21,0	26,2	31,3	+0,7	+ 5,2	+5,1	+11,0	154,2
Západoslovenský	7	23,1	31,2	42,3	47,4	+8,1	+11,1	+5,1	+24,3	183,1
Středoslovenský	12	17,3	22,9	30,9	34,9	+5,6	+ 8,0	+4,0	+17,6	201,7
Východoslovenský	9	15,6	22,3	26,5	32,5	+6,7	+ 4,2	+6,0	+16,9	208,3

Key:

(1) a) Districts with above average initial level of per hectare yields (compared with weighted average for CSSR)
(2) territory or kraj
(3) number of districts
(4) per hectare yield in quintals for given time period
(5) increase in quintal yield for period
(6) index for 1976-1980 period (1961-1965 average = 100)
(7) CSSR
(8) CSR
(9) SSR
(10) Central Bohemia
(11) South Bohemia
(12) West Bohemia
(13) North Bohemia
(14) Eastern Bohemia
(15) South Moravia
(16) North Moravia
(17) West Slovakia
(18) Central Slovakia
(19) East Slovakia
(20) b) Districts with below average initial level per hectare yields (compared with weighted average for CSSR)

For instance, it is essential gradually to change over to manual labor under conditions where there is a shortage of appropriate technology, etc. And even in these situations new and demanding requirements are placed on VTR. Another way to achieve greater increases in plant production is to orient this production within the framework of crop groupings which provide roughly similar per hectare production, to those crops which over the longer term have provided greater increases in per hectare yields.

From the point of view of a desired increase in per hectare yields, it is essential to evaluate trends in expended labor, both in relation to the total volume of plant production and in relation to individual product groups, to which we will return in some future articles.

The tasks of the Seventh Five-Year Plan in the livestock sector are not, generally speaking, as demanding as the tasks in plant production. Nevertheless, difficulties in the raising of several types of livestock are substantially greater than previously. The development of cattle husbandry should play a substantial role in increasing the volume of livestock production. Requirements for the development of this branch of livestock production will change during the 1981-1985 period, in connection with the development of other branches of livestock production. The quantification of these tasks, in relation to the past 20 years of development, are presented in Table 8. At the same time, the data for the 1981-1985 period are based on various development assumptions. In the first instance, development is assumed of individual branches of livestock production, with the exception of cattle husbandry, to correspond to population increases, i.e., so that an increase in consumption corresponding to the population increase can be assured by individual types of livestock products (this variant assumes an increase in the production of livestock products, with the exception of cattle husbandry, of 4.3 percent annually). In this instance, it would be necessary to assure an increase in cattle husbandry production on the order of 7-9.7 percent. In the second instance, the entire increase in livestock production is assumed to come solely from the intensification of cattle husbandry and the development of domestic animal husbandry for those animals which do not demand much concentrated fodder (under this variant, the intensity of swine and chicken for slaughter husbandry would remain at the level of the Sixth Five-Year Plan, with other branches increasing production to correspond to the population increase). Under these assumptions, it would be necessary to assure an increase of cattle husbandry and production on the order of 9.4-12.2 percent annually. The third instance factors in the problems of cattle herd turnover (which boils down to the need to increase the production of cows and cattle for slaughter to the levels of the Sixth Five-Year Plan)(see Table 8).

All three approaches point to the difficulty of the targets in the livestock production sector, and the increasing requirements on VTR in this sector (to assure the rational feeding of all livestock, an increase in the efficiency of all fodders, etc.).

From the viewpoint of the desired increase in the production of specific types of livestock, it is essential to evaluate the trend of expended labor, both in relation to the overall volume of livestock production and in relation to specific products and types of livestock. We will return to these issues in future articles.

Table 8. Summary Description of Development Trends of Livestock Production and 1981-1985 Livestock Production Targets

Produkt (23)	Produkce v mil. Kčs st. cen 1980 v průměru let (24)				(25) Přírůstek produkce v mil. Kčs st. cen 1980 za období			(26) Žádoucí vývoj v období let 1981–1985 podle přístupu		
	1961–65	1966–70	1971–75	1976–80	1.	2.	3.	I.	II.	III.
1. Jatečny hovězí dobytek a jatečná telata	8 467	10 798	12 444	13 215	+2 331	+1 646	+771	+1 913– +1 077	+2 672– +1 065	+1 622– +787
2. Mléko kravské	11 690	14 032	16 414	17 470	+2 342	+2 382	+1 056	+1 056	+1 056	+2 106
3. Jatečná prasata	9 106	9 965	12 025	14 205	+859	+2 060	+2 180	+811	0	0
4. Jatečné ovce	910	970	929	808	+60	−41	−121	+35	+35	+35
9. Jateční koně	31	11	8	3	−20	−3	−5	0	0	0
6. Jatečná drůbež	1 104	1 668	2 682	3 449	+564	+1 014	+767	+148	0	0
7. Vejce	2 377	3 098	3 870	4 175	+719	+771	+305	+180	+180	+180
8. Peří	274	291	168	104	+17	−123	−64	+4	+4	+4
9. Tržní ryby	118	147	166	185	+29	+19	+19	+8	+8	+8
10. Násadové ryby	24	50	71	90	+26	+21	+19	+4	+4	+4
11. Med	110	167	160	177	+57	−7	+17	+8	+8	+8
12. Vosk	5	7	7	8	+2	0	+1	0	0	0
13. Jateční králíci	189	514	711	597	+325	+197	−114	+26	+26	+26
14. Kožešinová zvířata	6	13	27	57	+7	+14	+30	+2	+2	+2
15. Chlévská mrva	1 869	1 838	1 842	2 038	−31	+4	+196	+88	+88	+88
16. Močůvka	125	122	122	132	−3	0	+10	+6	+6	+6
Položka 1–16 (17)					+7 284	+7 957	+5 067			
Celkový objem hrubé živočišné produkce (18)	36 285	43 487	52 184	57 611	+7 202	+8 697	+5 427	+3 253– +4 089	+3 253– +4 089	+3 253– +4 089
Počet skotu v tis. kusech (19)	4 466	4 365	4 498	4 843	−101	+133	+345	+200– +112	+280– +192	+271– +182
z toho krávy	2 019	1 923	1 913	1 902	−96	−10	−11	0	0	+100
ostatní skot (20)	2 447	2 442	2 585	2 941	−5	+143	+356	+200– +112	+280– +192	+171– +82
Produkce hovězího masa v tis. t (21)	397	500	589	642	+103	+89	+53	+95– +53	+133– +91	+81– +39
Produkce mléka v mil. l (22)	3 653	4 385	5 130	5 460	+732	+745	+330	+330	+330	+658

Key:

(1) beef cattle and calves for slaughter
(2) cow's milk
(3) swine for slaughter
(4) sheep for slaughter
(5) horses for slaughter
(6) poultry for slaughter
(7) eggs
(8) down
(9) fish for consumer markets
(10) fish for stocking
(11) honey
(12) wax
(13) rabbits for slaughter
(14) animals for furs
(15) cow manure
(16) dung water
(17) subtotal 1-16
(18) overall volume of gross livestock production
(19) number of livestock (thousands of head)
(20) composed of cows
other livestock
(21) beef production (thousands of tons)
(22) milk production (million liters)
(23) product
(24) production inmillions of korunas, 1980 standard prices for period
(25) increase in production for period, in millions of korunas at 1980 constant prices
(26) desired development for 1981-85 under techniques I, II, and III

Conclusion

This article presents one of the possible approaches to the statistical quantifications of VTR efficiency and its contributions to an increase in the utility and economic efficiency of agriculture.

The methodology stems from the specific objectives and tasks of agriculture which reflect primarily the growing level of satisfaction of social needs under conditions of a declining work force and the necessity for increasing economic effectiveness. These are manifested in a decreasing volume of labor and capital assets and a decreasing volume of labor value added and capitalized labor in each unit of production.

The methodology takes full account of the mutual interrelationships between factors, which are crucial for increasing utility and economic effectiveness, and understands this to be the result of the contributions of research, the application of research results under the broadest possible practical conditions, and as the result of changes in the mastery of research results by all participants in the work process.

VTR efficiency and its contribution to economic effectiveness is thus quantified during the phase "when science becomes a force of production." The methodology of this article, in addition to the dynamic of VTR efficiency on an increase in utility and economic effectiveness, has a further objective, namely, that of pointing out the areas where it is essential to focus VTR efforts in order to achieve the established objectives of the near future; of pointing out the changeability of those areas most intensively influenced by VTR during specific time periods; and of pointing out the influence of changing conditions on VTR efficiency and its economic effectiveness in specific time periods, etc.

Indicators for quantifying the dynamic of VTR effectiveness and its contributions to the economic efficiency of agriculture stem from available statistical indicators. The quantification itself has been conducted both in current and in constant prices, and occasionally in natural units. While constant prices make it possible to define VTR efficiency in a natural sense, current prices make it possible, for instance, to pinpoint the changing participation of the state in the development of the forces of production in agriculture in specific time periods, and furthermore to identify changing external and internal conditions for the assurance of capital assets for agriculture and changes in the social costs for providing them, etc.

The analytical approach itself stems from a recalculation of the above increases in specific time periods for a period of years, while utilizing established (or desirable) long-term trends, making it possible to apply this approach in broader connections, and specifically in planning and projection activities.

The quantification itself indicates that the substantial contributions of VTR achieved during the period of the restructuring of small-scale agricultural production to socialist mass production and immediately following this period have been gradually declining (due to the exhaustion of extensive factors of development, the nonrepeatability of the size of the decline in the labor force, greater demands for increased production volume, etc., the regulation of certain capital assets for agriculture--PHM [petroleum products and lubricants], imported fertilizers, etc.), thus placing new and demanding tasks on VTR, on the intensity of its practical implementation and on the breadth of implementation that it must achieve.

To evaluate the impact of those areas subject to the most and the least influence of VTR in efforts to increase utility and economic effectiveness, an analysis was undertaken of individual branches of agricultural development. The results of this analysis point to a varying role for VTR in the development of individual sectors of agricultural production and varying demands on VTR for the future.

From the viewpoint of the desired increases in specific sectors of agricultural development, it is essential to evaluate trends in expended factors of production, both in relation to the volume of plant and livestock production and in relation to individual crops and types of livestock. Discussions of these problems will form the content of future articles.

FOOTNOTES

1. The problem of measuring the efficiency of VTR and its contributions is very complex. The actual measurement of VTR efficiency can be oriented towards one or another phase. In this article that phase is the actual labor and production process.

2. Where a change in production relationships has created significant leeway for developing the forces of production and the application of VTR results, and simultaneously freed up a nonrepeatable amount of resources.

3. Even though the influence of natural conditions and weather conditions in specific years likewise have an impact on the quantities of means of which the quantification of VTR efficiency and its contributions is conducted, this problem is not discussed independently in this article. The same applies, for instance, to the influence of fertilizer imports on agricultural performance, etc.

4. For the purposes of this article we understand utility to be a component of economic effectiveness (which includes increases in per hectare yields and the usability of livestock), and we use the term to describe contributions to the production process stemming primarily from changes in the biological capacities of plants and animals, from changes in the conditions of exploitation of the biological capacities of plants and animals, from changes in the technologies applied to the labor process, etc. In addition to the above contributions, other influences come to bear on the outcome--economic effectiveness, primarily a change in the extent and efficiency of capital assets, a change in the qualitative aspects of the work force, a change in the interbranch and international division of labor, a change in the structure of the factors of production, etc.

5. As a basis for comparing the dynamics of VTR efficiency and for quantifying the magnitude of its contributions to economic effectiveness, it is desirable to choose a longer time period. There are practical reasons for this, for instance the research-development-production-utilization cycle itself, or the mass application of VTR results, which are never short-term, but rather long-term procedures. Research results in this period determine the efficiency of VTR and its contributions in terms of utility and contributions to economic effectiveness at a future time. The detailed application of the above methodological approach would furthermore make it possible to quantify in specific sectors the time lag between research-development-production and utilization and its consequences for an increase in utility and economic efficiency in a given time period, etc. An approach including a longer time period furthermore makes it possible to eliminate extreme influences in certain years. It makes it possible to objectivize the base, from which it is possible to evaluate deviations in achieved results over a shorter or longer time frame, makes it possible to establish tasks (and areas) and priorities for the entire spectrum of participants in whatever phase "when science becomes a force of production," with a view to the tasks established by the short-term and the long-term plan and with a view to limiting derivative changes in internal and external conditions.

6. Data presented in this article for the 1981-1985 period came from the 16th CPCZ congress guidelines. They have been recalculated by the authors, with account taken of long-term trends and measures adopted for the period of the Seventh Five-Year Plan. It is, therefore, necessary to consider them as orientational, as making it possible to verify the practical utilization of the methodological principle and for projection or planning activity.

9276
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MORE EFFICIENT USE OF ELECTRICAL ENERGY URGED

Leipzig ENERGIEANWENDUNG in German Vol 31 No 4, Jul-Aug 82 (manuscript received 25 May 82) pp 119-121

[Article by Dr Michael Steinfels, engineer, Working Group on Efficient Energy Use, GDR Council of Ministers, East Berlin: "Reducing Energy Consumption by Efficient Use of Electrical Energy"]

[Text] The intensified use of new findings from science and technology and their broad application are an absolute key point in further increasing the effectiveness of efficient use of energy in line with the economic objectives which are the result of the economic strategy for the 1980's. In this, the use of microelectronics will play a key role in the future.

On the one hand the development, improvement and use of electrotechnical operating equipment permit achieving a reduction in the energy requirements of all sources of energy, on the other hand electrotechnical operating equipment can decisively influence the electrical energy use of other electrotechnical operating equipment itself.

The necessity for more intensive treatment of the questions of efficient use of electrical energy is principally the result of the fact that in the next few years we must expect increased growth in electrical energy requirements.

The following will have a substantial impact on this increase in the coming five-year plan period:

--conversion of a number of technological processes from fossil energy sources to electrical energy (furnaces, smelting tubs, thermal treatment facilities, among others),

--raising the level of automation in industry and business (industrial robots, fully automatic machines and plants, among others),

--replacing diesel fuel by electric traction in the transport system and in stationary drive processes,

--increased use of electrical energy by heat pumps, air conditioning of buildings, among other things.

Based on an objectively determined limitation on the volume of primary energy, this requires guaranteeing a portion of the increased electrical energy requirements through savings.

Thus, efficient use of electrical energy to meet the GDR's needs for electrical energy takes on special importance.

1. Efficient Use of Energy Through Electrical Engineering and Electronics

The possibilities for minimizing utilization of electrical energy and other energy sources through the use of electrotechnical and electronic solutions and by rationalization in electrical engineering/electronics itself depend decisively on the optimal selection, shaping and the purposeful utilization of electrotechnical operating equipment. Beyond that, improving characteristic values of electrotechnological units, automation of technological processes with the help of microelectronic solutions and optimal transmission, distribution and conversion of electrical energy take on priority importance for saving, especially for electrical energy. Important possibilities for influencing the reduction of electrical energy requirements and for reducing the requirements for other energy sources of economically important process groups are shown in the following.

1.1 Use of Adjustable Speed Drives with Power Electronics

At present in the GDR power electronic devices are used primarily to control direct current drives for small and medium capacities, to reoutfit rotating machine converters and for electrical energy supply plants. Beyond that, there are a number of other possibilities for achieving electrical energy savings through the use of power electronics, among others, in the following sectors:

--through reequipping additional electrical energy supply systems (in mining, for example),

--through the control and operation of furnaces and thermal treatment facilities,

--through the use of three-phase drives,

--through use in rail vehicles,

--through use in welding and household devices and consumer goods.

As a key issue, at present, power electronic devices and facilities are utilized for the no-loss speed setting of direct current drives. They are produced in the VEB Automation and Plant Construction Combine with outputs of 16 kW (DT 0/ to 63 A) to 400 kW (DT 2/ to 1,000 A) for three-phase connection.

In the case of the three-phase motors, which are more significant in terms of energy economy and for which at present in the GDR there are only isolated instances of use, the extent of outfitting is still inadequate.

For example, a large part of the drive energy which is to be produced overall in the economy is converted in three-phase drives for pumps, ventilators, compressors and blowers. Key uses here are the chemical industry, metallurgy, water management and the housing system.

By necessity measures for saving energy in these sectors have special economic importance. In fact, in the case of drives for pumps, compressors and blowers the energy economy can be substantially improved if motors with power electronics and thus variable speed are used in place of the conventional three-phase motors with constant speed.

The change in flow delivered, which is typical of pump drives, through throttling is then guaranteed by adapting the speed of the motor to the process conditions. On the average this permits saving about 30 percent of the electrical energy.

Within the context of an initiative program in various sectors of the economy eight pump drives with power electronics were installed and tested. The first evaluations confirm the energy savings (Table 1).

Table 1: Energy Savings By Pump Units With Power Electronics

User Enterprise	Type of Use	Output in kW	Relative Energy Saving in percent	Estimated Annual Energy in kWh/a
VEB BKK [Lauchhammer Brown Coal Combine] Bitterfeld	Water pump	75	20-25	130,000
VEB CK [Chemical Combine] Bitterfeld	Filter pump	30	20	60,000
VEB WAG [Water Supply and Sewage Treatment Combine] Halle	Water pump	80	18	100,000
VEB PCK [Petrolchemical Combine] Schwedt	Long-distance heating pump	53	26	84,000
VEB PCK Schwedt	Controlled volume pump	2	60	5,400
VEB CK Piesteritz	Water pump	50	20	110,000
VEB TGA [Technical Building Equipment] Leipzig	Heating recirculating pump	30	30	1,200

For maximum utilization of the possibilities for energy savings through the use of power electronics, an analysis of the user sectors is indispensable for a systematic approach with respect to additional frequency changer use.

The use of power electronic plants for melting and heating processes in metallurgy is also important in respect to industrial energy.

The VEB Inducal Goellingen, an enterprise in the VEB EAW [railroad repair yard] Combine, Berlin, produces for these processes static middle-frequency changers of the types IMU-P 250/2,4 and IMU-P 1,250/0,5 for 250 kW and 1,250 kW.

With the use of a rotating frequency converter the electrical energy savings amount to about 30 percent by virtue of a static middle-frequency changer.

1.2 Improving Characteristic Values of Electric Motors

In the GDR about 45 percent of all electrical energy consumption is converted in the electric motor drives.

A reduction in consumption of electrical energy in the future can be anticipated primarily by changing the characteristic values "efficiency" and "rate of utilization."

Just increasing the efficiency of a three-phase motor with an output of 1,250 kW by only 0.4 percent reduces the power loss by about 5 kW. With a yearly operating time of about 5,000 hours this achieves energy savings of about 28 MWh/a. Worldwide the trend toward production of three-phase motors with greater efficiency using the same amount of active material is becoming established to an increasingly greater degree. Thus, in the future it will be a matter of achieving, on a long-term basis, improvement in efficiency of electric three-phase drives and thus substantial electrical energy savings through the intensified use of science and technology, especially in the production of the high quality dynamo belt.

In addition to improving the efficiency of electric motors by changing technological parameters electrical energy savings can be primarily achieved on a short-term basis in those cases where adapting the machine to the process can be cited as optimal. Thus, for example, on the average there is only about 60 percent utilization of the drives employed in the chemical industry. Because of deteriorating efficiency this results in increased energy losses.

Raising efficiency for partial loads without changing the machine itself can be accomplished, for example, by adjusting the voltage to the specific load. A voltage setting with power electronics or a simple commutator winding (star-delta) can be provided for this. In the small load sector this produces lower electrical energy losses and thus a higher level of efficiency.

Beyond this, precise tracking of the industrial energy use conditions with the user and the reworking of design guidelines in the future are of decisive importance for the use of electric drives.

1.3 Industrial Energy Optimizing of Technological Processes Through Use of Microelectronics

Substantial possibilities for saving both electrical energy and other energy sources are provided by increased automation through the use of microelectronic component systems, of parts and systems for measuring, controlling and transmission, which are based on microprocessor technology.

Through optimal control and operation of plants and processes on the basis of increased use of microelectronic component systems it is possible to achieve energy savings which up to 1990 will increase annually to the equivalent of 9 million tons of crude brown coal. One example is the automated start-up process in power plant systems.

The possibility of controlling the process economically with the help of process representations on microcomputer-controlled color display units can be utilized to support start-up of power blocks in power plants. Substantial energy savings can thus be anticipated.

A further example is the control of cement mills with microprocessor systems whereby for each mill about 850 MWh of electrical energy can be saved annually.

With the further development of the "ursamat" electronic component system the conditions were created in the DR to fulfill in various industries the requirements for further automation, primarily of technological processes which are important in terms of industrial energy.

The systems which were developed on this basis

--ursalog 4000,

--ursalog 5010 and 5020

help establish an international standard and are user-compatible in respect to functional and design parameters and reliability.

Within the "ursamat" system "ursatron 5000" is a uniform electronic system of equipment, devices and components for automating technological processes with the subsystems:

--ursadat 5000	--data-recording equipment with microcomputer,
--ursalog 5000	--stored-program control equipment,
--ursatrans 5000	--remote action equipment with microcomputer,
--ursamer 5000	--microprocessor regulator and computing function unit,
--ursacord 5000	--indicator and recording instruments.

The K 1510, K 1520 microcomputers and the equipment of the K 1610 family can be used for the primary processing system. Through the use of these equipment systems it is possible to achieve, as result of extremely optimal operation, important energy savings in the process which are controlled or regulated by them.

Beyond that, through the use of microelectronic components in automation systems a large number of technological processes can be simultaneously controlled in an energy-optimal manner.

An example of this:

Modern complexes of buildings contain a large number of in part extensive domestic facilities. Energy-efficient operation here with conventional MSR [microcomputer systems] technology is scarcely possible or possibly only at extremely high cost. Subjective influences play a decisive role.

To solve these problems the VEB Teltow Equipment and Regulator Works developed the GAA 5000 building automation system which has a microelectronic basis for use in social structures, in comprehensive housing construction and for industry. Its use makes possible energy savings of 15 percent and more in the case of social structures. Systems of this kind can also be anticipated in the future for process automation facilities. The use of this technology in the GDR economy supports the objective of developing extensive energy reserves through the broad application of microelectronics.

1.4 Additional Key Uses

In addition to the sectors mentioned, such as power and microelectronics and improvement of efficiency in the use of electronic drives, the operator of electrotechnical facilities and the designer have available today a large number of additional possibilities to pursue the demands to use electrical energy economically and efficiently. In detail this can be done by:

--optimal arrangement and selection and economical operation of motors, transformers and cables,

--reducing or influencing, respectively, peak loads by the use of automatic control and regulating equipment; industrial energy rationalization through partial switching down,

--avoiding reactive power losses through reactive power compensation located near the consumer and through improvement of the electrical energy quality of electric networks,

--use of optimal lighting technology,

--increased use of electrotechnological processes (for example, magnetic conversion, high-frequency drying, induction heating, among others),

--use of microelectronic solutions in the household appliance and consumer goods sector and in electric space heating,

--use of advanced measuring and sensor equipment.

In subsequent issues representatives from industry, the economy and from science and technology will report on a number of the key issues cited.

2. Concluding Remarks

From what has been presented it is obvious which possibilities presently exist from efficient use of electrical energy and other energy sources through the use of electric and electrotechnical equipment and in which directions thinking and planning should go for the future.

Both for new planning, but also especially for facilities and processes already in operation and having poor energy utilization, electrical energy savings depend decisively on selection and optimal use of electrotechnical operating equipment.

In the future, broad application of microelectronics will take on special importance for saving energy. With the availability and the purposeful use of microcomputer technology, including the necessary electric and electronic components, the prerequisites are created to develop new possibilities for reducing energy consumption in all sectors of the economy.

12124
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STRUCTURE OF FARM POPULATION IN REPUBLICS, PROVINCES

Belgrade EKONOMSKA POLITIKA in Serbo-Croatian 27 Sep 82 pp 25-26

[Text] According to last year's census, 4,291,772 Yugoslaves (20 percent of the total population) are agricultural workers, reports the Federal Institute for Statistics. In Serbia proper, 28 percent of the total population is agricultural, as compared to 25 percent in Kosovo, 22 percent in Macedonia, 20 percent in Vojvodina, 18 percent in Bosnia-Hercegovina, 15 percent in Croatia, 13 percent in Montenegro, and 9 percent in Slovenia. There are 1,936,341 men (45.1 percent of the agricultural population), and 2,355,431 women (54.9 percent). As much as 35.3 percent of the agricultural population lives in Serbia proper, as compared to 16.2 percent in Bosnia-Hercegovina, 15.6 percent in Croatia, 9.1 percent each in Vojvodina and Macedonia, 8.9 percent in Kosovo, 4 percent in Slovenia, and 18 percent in Montenegro.

There are 2,487,646 active agricultural workers (58 percent of the total agricultural population), of which 1,306,958 are men (67.5 percent of the total number of men in the agricultural population) and 1,180,688 are women (50.1 percent of the total number of women in the agricultural population). Of the active agricultural population in Yugoslavia, 43.2 percent lives in Serbia proper, 16.7 percent in Croatia, 13.7 percent in Bosnia-Hercegovina, 8.7 percent in Macedonia, 8.6 percent in Vojvodina, 4.7 percent in Slovenia, 3.3 percent in Kosovo, and 1.1 percent in Montenegro. There are 2,363,621 agricultural workers working on individual farms, including 44.7 percent in Serbia proper, 16.4 percent in Croatia, 13.9 percent in Bosnia-Hercegovina, 8.2 percent in Macedonia, 7.6 percent in Vojvodina, 4.6 percent in Slovenia, 3.3 percent in Kosovo, and 1.1 percent in Montenegro. The active agricultural population constitutes 27 percent of the total active population of Yugoslavia; the active agricultural population in Serbia proper constitutes 38 percent of the active population, as compared to 29 percent in Macedonia, 25 percent in Vojvodina, 24 percent in Kosovo, 23 percent in Bosnia-Hercegovina, 21 percent in Croatia, 15 percent in Montenegro, and 13 percent in Slovenia.

Of the total number of 1,804,126 agricultural inhabitants supported in Yugoslavia, 24.3 percent live in Serbia proper, 19.8 percent in Bosnia-Hercegovina, 16.5 percent in Kosovo, 14 percent in Croatia, 9.9 percent in Vojvodina, 9.8 percent in Macedonia, 3.1 percent in Slovenia, and 2.6 percent in Montenegro. Of the total number of agricultural inhabitants in Kosovo, as many as 78.3 percent are supported, as compared to 62.5 percent in Montenegro, 51.2 percent in Bosnia-Hercegovina, 45.6 percent in Vojvodina, 45 percent in Macedonia, 37.9 percent in Croatia, 32.4 percent in Slovenia, and 28.9 percent in Serbia proper.

According to the Federal Institute for Statistics, the agricultural population is understood to include all agricultural workers, fishermen, and hunters, as well as all of the individuals supported by them. The data are not comparable with those from previous censuses because of different definitions of the agricultural population.

9909
CSO: 2800.34

YUGOSLAVIA

INFLATION LOWERS STANDARD OF LIVING FOR PENSIONERS

Belgrade EKONOMSKA POLITIKA in Serbo-Croatian 27 Sep 82 pp 25-26

> [Text] At the end of the month, the issue of the rate at which pensions are adjusted in accordance with the growth in personal incomes will be brought up again at the Federal Conference of the Socialist Alliance [of Working People of Yugoslavia]. This is a question of taking action to preserve the standard of living of pensioners. The high rate of inflation is in fact requiring more frequent adjustments because of the sharp decline in buying power. At the same time, it is also requiring a correspondingly greater caution because of the sharp increase in the allocations for pensions. This contradictory trend is complicated even further by solutions differing among the republics and provinces.

Of a little over 1.6 million pensioners last year, as many as 1.2 million received pensions less than 6,000 dinars, while a fourth of these pensioners received an insurance supplement, which, together with the pension, did not exceed 5,200 dinars. This datum can be supplemented with another: between 1976 and 1981, there was a real annual decline in pensions, ranging from 0.4 to 0.2 percent in Serbia proper and Vojvodina to 1.4 percent in Macedonia and 1.7 percent in Kosovo. If these years are taken individually the picture is even more serious. Thus, a sharp decline in the real value of pensions was noted in 1980--the first year since the institution of a change according to which pensions are no longer tied to trends in the cost of living, but rather to trends in personal incomes--when it amounted to 7.6 percent. In the following year, 1981, the decline was even larger--10.4 percent. It should be noted that this is an overall calculation of the relationship among the pensions, personal incomes, and the cost of living for one year.

Viewed within a 12-month period, the real decline observed in pensions varies depending on the frequency of the adjustments. This is because in addition to the so-called regular adjustments, which match the annual increase in personal incomes and the growth of pensions, which are increased by the same amount, extraordinary adjustments, resulting from the sharp increase in the cost of living, are becoming more and more necessary. They are even provided for by the new law on the basic rights in pension and medical insurance, as a matter of monthly calculations. We will have to wait until 1985 for this innovation, which was added to the law at the last minute and which was also narrowly passed. By that time, as the proposers and those who voted for this believe, the economic situation will have improved enough to be able to bear the burden of a continual increase in allocations for pensions.

Diversity Among the Republics

Without discussing how realistic this innovation is--time will show who is correct--it should be noted that not even the present adjustments are arranged so as to maintain the pensioners' standard of living within acceptable limits. In the report on the socioeconomic position of pensioned workers that was drawn up by the Presidency of the Federal Conference of the League of Pensioners of Yugoslavia, a diversity is noted in the solutions in the republics and provinces that directly affects the financial position of the pensioners. As many as 23 areas are cited which are preventing a standardized position in the system for pensioners in Yugoslavia; among these, one of the most pronounced has to do with the adjustment of pensions in the course of the years. This particularly affects new pensioners, for whom their pension at the start drops below three-fourths of their last salary, because of the way in which the base is determined; there are pessimistic estimates that reduce this ratio to somewhere between 55 and 60 percent.

Five communities (Slovenia, Bosnia-Hercegovina, Macedonia, Serbia proper, and Vojvodina), during the extraordinary adjustments, do not adjust the pensions for which the preceding year was the last year for insurance, i.e. the year from which the average salary was used as the base for the pension. Three communities, however (Croatia, Montenegro, and Kosovo), adjust pensions by the so-called 12ths, i.e. in proportion to the part of the total increase in pensions that corresponds to the number of months in the preceding year in which personal incomes were not used to calculate the base for pensions.

Thus, in some cases the new pensioners wait a year and a half for adjustments. It is not necessary to stress in particular what this means, given the rate of inflation.

In defending the request for standardization and for as frequent as possible an adjustment in pensions to match the current increase in personal incomes, people usually emphasize the sacrifice suffered by the pensioners as a result of the regulation that changed the adjustment parameter from the cost of living to personal incomes. This measure has threatened the standard of living of the pensioners even more because it has come at the time of a sharp increase in the cost of living; it is felt to be a half-way measure (introduced, in that, as a logical consequence of the fact that pensions, like past labor, have to share the fate of personal incomes), because it did not include several other elements which are generally implied in connection with this kind of relationship between pensions and personal incomes. These are primarily differences in determining the pension base (by the last year of insurance) that would not reduce the standard of living of new pensioners as drastically. Since this regulation--introduced and passed at the same meeting that discussed and adopted the new law, which had been in preparation for 7 years--was left for implementation during the next medium-term period, we are left with calculating how much the stabilization measure of shifting the parameter has "cost" the pensioners, since the cost of living has grown more rapidly than personal incomes. The amount of expenditures for pension and invalid insurance in 1981 was 9.5 billion dinars lower under the new accounting system, and this year (judging by the first six months) it will be 10.5 billion lower. These 20 billion are considered to be a measure of the decline in the real value of pensions in the last 2 years, since the innovation was implemented.

Since July, pensions have increased between 10 and 11 percent in the republics and provinces in comparison with January 1982. In view of the freeze on prices, it is felt that the real fall in the value of pensions this year will be more than 50 percent less than last year's decline. There is another side to the coin, however: the expected increase in pension receipts (34 percent), along with about 5 percent more new pensioners, will increase the total expenditures a great deal--by 40 percent in comparison with the preceding year, when they amounted to 153.5 billion dinars. The sharp increase in expenditures (in previous years it averaged a little over 30 percent), which was alleviated last year by the reduced growth of personal incomes and thus also a correspondingly lower growth in pension contributions, will seriously shake the financial state of the community. At the time of the regular calculation and adjustment of the growth of personal incomes and pensions next year, which will be done at the beginning of 1983 for all of this year, one should also add the growth in funds for the increasingly greater influx of old-age pensioners, which indicates a further increase in expenditures by at least 40 percent.

This sharp increase in expenditures requires either than an increased contribution rate be introduced, if the growth in personal incomes is slowed, or that the communities be forced to completely exhaust their already strained reserves and begin to gather short-term credits again in order to pay pensions regularly.

It should be noted that in 1980 there were 280 pensioners for every 1000 workers, and that in the next two or three years this ratio will be 312 pensioners for every 1000 employees, with a continuing trend toward an increase in the number of pensioners. This endangers not only the innovations authorized for that time (1985) in connection with the calculation of the base pension and the adjustment of pensions in accordance with personal incomes, but also, to put it bluntly, the possibility for the survival of the entire pension system.

9909
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REPUBLIC FOREIGN TRADE, JANUARY-SEPTEMBER 1982

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 26 Oct 82 p 3

[Article by M. Urosevic: "Exports Down 4 Percent in Real Terms"]

[Text] The preliminary results of visible foreign trade over the first 9 months of the year do not afford much occasion for satisfaction unless new efforts, very real ones, are made to augment exports. Two factors have had a considerable bearing on the results, and a constant remark of business people at meetings in economic chambers and general associations is that there was not enough selectivity concerning imports of raw materials and production supplies nor concerning exports of raw materials, though this obviously was unwise.

Recently several representatives of the largest export organizations, referring not only to the value of sales of goods abroad, but also to the ultimate benefits, insisted in the Economic Chamber of Serbia on a greater influence of precisely that element. It is not socially justified, they said, for certain exemptions to be granted, say, for every 100 dinars of exports regardless of whether that same organization has imported goods worth 200 dinars, as for the organization that exports 100 dinars' worth, but imports only 50 dinars' worth or still less.

There have been constructive changes in foreign trade, and it is estimated that measures will be adopted which, along with the specific activity of work organizations, will tend to invigorate exporting before the end of the year.

But that is something to be analyzed on another occasion, and until then, continuing the newspaper's practice, we give the figures on visible trade for the first 9 months by republics and provinces. In view of the responsibility of these sociopolitical communities for foreign economic relations, their results to date will be of use in efforts to improve visible trade in coming months.

For the country as a whole exports in the first 9 months were up 3 percent over the same period of last year, but because export prices were 7 percent higher, the results were actually down 4 percent in real terms. At the same time imports dropped 11 percent in nominal terms, while there was a 2-percent rise of import prices, which means that the high coverage of imports by exports was paid for with a 13-percent reduction of imports in real terms.

Actual Results for the Period January-September 1982

Region	In Millions of Dinars			Share of Exports in Imports, %	Share of Total, %		
	Exports	Imports	Deficit		Exports	Imports	Deficit
Yugoslavia	299,377	407,193	107,816	73.5	100.0	100.0	100.0
Bosnia-Hercegovina	43,871	57,828	13,957	75.9	14.7	14.2	12.9
Montenegro	5,205	8,353	3,148	62.3	1.7	2.0	2.9
Croatia	66,878	101,110	34,232	66.1	22.3	24.8	31.8
Macedonia	15,415	24,436	9,021	63.2	5.2	6.0	8.4
Slovenia	58,583	66,990	8,407	87.4	19.6	16.5	7.8
Serbia proper	78,998	95,584	16,586	82.6	26.4	23.5	15.4
Vojvodina	23,622	30,363	6,701	77.8	7.9	7.5	6.2
Kosovo	5,813	6,631	818	87.7	1.9	1.6	0.8
Federation	993	15,897	14,903	6.0	0.3	3.9	13.8

Thus the negative difference has been reduced to 107.8 billion dinars, as against 164.9 billion last year in the same months, which is a drop of 34.6 percent, but the situation on the convertible market is still unfavorable in spite of the modest improvement. Exports to that market were up 6 percent over the 9-month period, which means a drop of 1 percent in real terms, while imports from that area, just like total imports, dropped 11 percent in nominal terms and 13 percent in real terms. The coverage of imports by exports is 57.8 percent, and the negative difference, though .3 of a percentage point less than at the same time last year, reached a figure of 125.5 billion dinars, so that a certain surplus in trade with other currency areas was unable to mitigate it to any significant extent.

In any case, when we look at the figures in the table, it is striking that the most negative relationship in all three types of trade--exports, imports and the deficit--is for Croatia, which has a share of only slightly more than one-fifth of exports, but approximately one-third of the deficit, while Slovenia and Serbia proper can be tentatively said to have been more disciplined in this regard.

However, a truly illogical situation is still maintained in which the coverage of imports by exports of the various republics and provinces, when applied to a common denominator, is considerably higher than the average for the entire country.

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CHANGES OF PRIVATE FARMERS' ROLE DISCUSSED

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 23-25 Oct 82 p 3

[Article by Djura Djukic: "The Private Farm Is an Important Topic of Public Discussion"]

[Text] Certain trends in rural areas depart from the constitutional concept and are attracting private farmers to the path of economic individualism.

The private sector yields less output in relative terms than the other sector, the socialized sector, which is set up in opposition to it as a model and organizer of their mutual cooperation. This fact is reiterated in discussions like a refrain, to which is added the fact that one reason why the private farm is not producing larger surpluses for the market is that considerably less is being invested in it.

A glance at investment policy confirms this beyond question. In the period from 1957 to 1961 the ratio of investments in the socialized sector to those in the private sector was 70:30, and in the period 1977-1979 it was 48:52. There is a shift toward the private sector, but its large dominance in both area and the number of livestock should be borne in mind.

Trends have also been similar with respect to consumption of manufactured fertilizers. In the 1957-1961 period consumption was divided into 56 percent for the socialized sector and 44 percent for the private sector, but between 1977 and 1980 structural changes brought about a somewhat better relationship: 38:62. Again we must take into account the size of the sectors if we are to see the subordinate position of the private farms. They are in any case viewed as holders of large amounts of arable land and implements for production and an underutilized potential for food production.

The Divided Nature of the Private Sector

There is talk today about the stagnation of production not only in this sector, but also in the socialized sector, so that by and large they are not managing to keep up with demand. Shortages being made up with imports are proof of this. Hundreds of thousands of private farms, according to the concept of agriculture that has been adopted, are being oriented toward cooperation with socialized organizations, toward formation of cooperatives, and toward cooperation with the socialist farms. Today there are about 2,500 farms of various types, about 260,000 associated farmers and slightly more than 1 million farmers involved in lasting or occasional cooperation with cooperative organizations.

The number of private farmers in rural areas, however, is considerably larger than that organized portion of the peasantry, but there are also those who doubt that these figures correspond to reality. That mistrust is giving rise to new tones in discussions of the private farm and of its role in carrying out farm policy, which according to many of those familiar with this problem area is simply not being carried out.

Critics who are preparing for participation in the discussion during the "Kardelj Days" early next year in Osijek have begun to make an issue even of the language used in speaking about processes in agriculture and in rural areas. This is a language, they say, which has become ossified and bureaucratized and which conceals the true state of affairs. It is a sign of a kind of inertia that there is constant talk about the socialized and private sectors, though no such division exists in the constitution and Law on Associated Labor. It is only in political documents that these terms have won legitimacy.

The term "sector" does not exist in the constitution. It dates from an earlier period and is redolent of the administrative period of construction and the administrative vocabulary, and now economic integration of agriculture is being sought on the foundations of self-management. The cooperative is supposed to belong to the private farmer. In practice it is not his. It is said that the private farmers are supposed to have influence on the cooperative. Not influence, the critics say, but something more: they are supposed to run the cooperative.

The remarks are interesting, as are the questions which are put by those debating these problems. Instead of integration, runs one notable opinion, in the field there is frequently defense of the partial interest of a portion of the working class, associated, for example, in a sugar mill, or oil pressing mill, which is portrayed as socialist and as such is set in opposition to the partial interest of the private farmers. Going on to elaborate this particularistic logic, the critics note that peasant production is diversifying, while the broad outlines of policy call for it to become specialized, in other words, for it to become consolidated and linked with the appropriate phases of processing, which takes place in the socialized sector.

Short-Term Pragmatism

At one time more production was contracted for in advance. It is being noted that in Vojvodina 80-90 percent of the crop was contracted for in advance a few years ago, while now this proportion has dropped to 60 percent. What does this mean? The private farm is not headed toward integration on the foundation of self-management, toward a community with combines in the framework of a unified agroindustrial complex. Rural society is being stratified, by a coincidence of circumstances the private holding is developing autarkically and is becoming a freewheeling operator which is getting along on its own. The reference is to individuals who are leasing land from elderly people and are becoming rich "in the wrong way." The essential goal contained in the constitutional vision of the socialist transformation of agriculture--the socialization of production--is not being attained. The rate at which the private farm is being included in the true developments of integration and self-management is very slow. It is caught up with short-term pragmatism. There are strong tendencies leading toward conservation of economic individualism.

Nor, of course, have these observers failed to see the lifelessness of the cooperative movement. The cooperatives, since they are not something the peasants created, are organizations which "work with the peasants." Nor are the cooperative alliances what the name implies: as one analyst has put it, their purpose is to popularize current policy and to be concerned with the conditions for conduct of economic activity. The critics are those with the best memory: they remember better days for the cooperatives, in the sixties, and they say with nostalgia that a study should be made of why that situation was changed!

The changes noted in the language of the discussion are a good sign that people have begun to ferret beneath the rhetorical facade which has concealed the status quo. The boom of production which is expected of rural areas, of all farms, both "socialized" and "private," presupposes a good analysis of errors in policy toward agriculture, toward the private holding, toward rural areas. When light is shed on events in past years, the paths which should be taken in future will be clearer.

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STATUS OF IRRIGATION SYSTEMS IN YUGOSLAV FARMING SURVEYED

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 26 Oct 82 p 8

[Article by Djura Djukic: "Abundance of Water, But a Lack of 'Water Carriers'"]

[Text] The emphasis is on food production and on everything that contributes to that goal. Recently the most frequent topic has been the factors important to increasing yields, such as seed and manufactured fertilizers, but there are also other factors which ought not to be overlooked. Irrigation is among them.

Yugoslavia has a satisfactory amount of water. Unfortunately, the distribution is not good either in terms of geography or season. About 2 percent of the arable land in the country is irrigated, but this area might be much higher. The European average for irrigation is much better, and in certain European countries it is even considerably higher than the European average. If we start at the top, with rainfall, the quantity is smallest for the central portion of Macedonia, the Morava region and the Pannonian Depression and Slavonia.

In Vojvodina only 30 percent of annual rainfall comes in the summer, and even that amount quickly evaporates, as Tome Kuzmanovski, M.A., emphasizes in his book "Navodnjavanje u Jugoslaviji" [Irrigation in Yugoslavia].

Substantial portions of land in Yugoslavia are suitable for irrigation--about 8.4 million hectares. There are 5.4 million hectares in the first three classes. About 25 percent of the area of Yugoslavia consists of plains less than 200 meters above sea level. These are the Pannonian Depression and the river valleys. To this we can also add some higher areas suitable for intensive agriculture, so that we can say that about 53 percent of the land in Yugoslavia is suitable for irrigation.

In spite of the adequate amount of water in global terms, certain parts, especially those which are most fertile, do not receive the necessary amount of moisture. Droughts are frequent in our grain-growing regions. The consequences of relatively frequent droughts are well known in Vojvodina. And the abundance of water necessary for agricultural purposes is to be found far away, in the hilly and mountain areas. The country's eastern portion, where the population density is highest and where there is the greatest use of water in agriculture, receives in relative terms the smallest amount of water in Yugoslavia's hydrographic network, which is, incidentally, abundant.

Irrigation systems began to be built long ago, but many were not completed on time, or work on them was even suspended. The largest irrigation structures are to be found in Vojvodina, in Kosovo and in Macedonia.

The conclusion from these figures is clear: the need for irrigation is great indeed, and there are also large arable areas suitable for irrigation. The issue is investment capital, which up to now has not been adequate, and from now on there perhaps will be still less of it. But good irrigation projects need to be drawn up for certain regions where it is possible to achieve high yields provided the water problem is solved and they should be carried out quickly.

Differences in yield between irrigated and nonirrigated areas are obviously "rooting for" the systems. Studies in Prizren and Bitola, for example, have shown that an irrigated field yields a 50-60-percent larger yield than areas outside irrigation systems. In Srbobran irrigated corn had a yield as much as 30 percent higher, in Ovcije Polje up to 60 percent higher. In Futog the yield of wheat is 20 percent higher on irrigated areas than on ordinary plowland. In experiments with apples in Vinkovci the yield was raised approximately 20 percent, and the increase was about 15 percent with grapes in Mostar.

The situation does not allow for grandiose undertakings in development of irrigation, since the investment capital is lacking for that, but that same situation (dressed up with the shortages in the production of field crops) argues that work should be done on irrigation wherever it can be done with small investment, even if it is a question of using ancient forms of bringing water to the fields. Attention should also be paid to more optimum use of irrigation systems in place, in which quite evident results can be achieved not only through greater use of water, but also through better adaptation of the crop pattern.

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PRODUCTION, RESERVES IN THE STEEL INDUSTRY, 1982

Belgrade CELIK in Serbo-Croatian Aug 82 pp 33-34

[Excerpts] The drop in deliveries for the domestic market recorded in the first quarter continued on a considerably larger scale over the first 6 months of 1982. Total deliveries for the market in the first half of 1982 were down 428,985 tons, or 17 percent, from the same period of 1981, and that 16 percent from steel mills (318,223 tons) and 20 percent imported (110,760 tons). One of the principal reasons for this worsened supply of the market lies in the shortage of foreign exchange. The lack of foreign exchange had an impact not only toward reducing direct imports of finished steel products, but also affected domestic deliveries, since the steel mills did not have enough foreign exchange to import the necessary raw materials and semifinished products. Imports of semifinished products alone dropped 54 percent in the first 6 months of this year as compared to the same period of last year; that is, imports this year amounted to 238,575 tons as compared to 520,022 tons in 1981.

This kind of drastic restriction in supply has had undesirable consequences for the market and through it for total industrial output, whose growth over the first 7 months was only 0.7 percent over the same period of 1981.

Inventories of steel products in the hands of steel manufacturers and in the distribution network are shrinking more and more and putting certain work organizations into a situation of cutting back on production. The problem lies not only in the quantitative reduction of deliveries, but also in the inadequacy of deliveries and existing inventories with respect to assortment.

To be sure, there are enough of certain products on the market, so that one cannot speak of a shortage of these products on the market. This group of products includes medium- and heavy-gauge sheet beginning with 12 mm of thickness, large-diameter welded pipe, and heavy steel shapes.

With respect to the supply of the market in terms of assortment, there were larger changes during the first half of 1982 than in the previous period, as can best be seen from the following table:

In tons

Indicator	Deliveries From Steel Mills	Purchases of Imports	Total Available for Market
Deliveries in the first half			
Of 1982	1,648,521*	444,673	2,093,194
Of 1981	1,966,744	555,435	2,522,179
First half of 1982			
First half of 1981	84	80	83

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* Not including the deliveries of two quite small work organizations (galvanized sheet and large-diameter welded pipe).

The change of the supply of the market for particular products over the first 6 months of 1982, compared with the same period of time in the previous year, shows the following pattern:

Type of Product, in tons	From Steel Mills		Imports		Total for Market	
	First Half of					
	1981	1982	1981	1982	1981	1982
Railroad rails and accessories	23,011	22,236	3,612	3,151	26,623	25,387
Heavy section steel	53,000	30,902	10,839	4,819	63,839	35,721
Medium and light section steel[1]	265,500	239,156	86,100	74,980	351,600	314,136
Reinforcing steel	414,841	278,521	892	1,305	415,733	279,826
Rolled wire	40,226	31,498	51,832	32,380	92,058	67,878
Total section steel	796,578	602,313	153,275	120,635	949,853	722,948
Heavy and medium sheet[2]	419,500	373,947	103,317	77,018	522,817	450,965
Light hot-rolled and cold-rolled sheet[3]	164,797	235,776	110,623	103,142	275,420	228,918
Galvanized sheet	47,332	22,723	27,674	7,844	75,006	30,567
Tinplate	--	--	35,550	27,518	35,550	27,518
Hot-rolled sheet	16,306	9,990	34,047	17,857	50,353	27,847
Cold-rolled sheet	96,365	87,703	26,737	30,312	123,102	118,015
Welded pipe[4]	207,171	206,103	4,740	3,237	211,911	209,340
Total flat steel	951,471	826,242	342,688	266,928	1,294,159	1,093,170
Seamless pipe	64,031	80,104	37,564	35,320	101,595	115,424
Drawn wire	127,482	113,378	21,233	20,227	148,715	133,605
Forged steel	25,130	23,711	353	1,092	25,483	24,803
Rolled steel wheel rims	2,052	2,773	322	471	2,374	3,244
Total "miscellaneous" products	218,695	219,966	59,472	57,110	278,167	277,076

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1 Including fine-quality and calibrated steels.

2 Including ship and boiler plate and lamele.

3 Including electrosheet just as in the case of cold-rolled strip.

4 Including cold-formed section steel and pipe shapes.

In the first half of 1982 deliveries to the market of section steel were down 223,000 tons (or 31 percent), while flat products were down 201,000 tons, or 18 percent. Deliveries of "miscellaneous products" in 1982 remained at approximately the same level as in the previous year. In the case of section steel, the largest drop in deliveries to the market was recorded for reinforcing steel. As for flat steel, the largest drop was recorded for deliveries of heavy and medium plate and sheet, while deliveries of welded pipe showed the greatest stability (which does not mean that the market was well supplied in terms of assortment). The sole increase in supply of the market over the previous year was for deliveries of welded pipe, and that mainly thanks to deliveries from steel mills.

The situation of inventories in the hands of producers, to the effect that they were up 1 index point over the previous quarter, has no great importance to the supply of the market.

The status of inventories in the distribution system is that they are declining appreciably, which is best described as a situation on the market where in spite of the inventories of the distribution network, the inventories of steel products are dropping steadily even in the hands of a majority of steelmakers, so that they have reached a crisis situation for certain products. Characteristically, the trade network has relatively large inventories of heavy and medium plate and sheet (mainly thicknesses of 12 mm and more [original reads "up to 12 mm"] and large-diameter welded pipe.

Steel Products	Producers (steel mills)	Distribution Network*
Total inventories as of 31 March 1982, tons	112,774	72,741
Total inventories as of 30 June 1982, tons	114,302	64,685
30 June 1982/31 March 1982	101	89

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* Figures for the nine largest specialized steel distributors, who account for more than 50 percent of total business with the steel mills (formerly referred to as A and B wholesalers): "Celik," "Tehnopromet," "Kopaonik," "Ferimport," "Metalka," "Kovinotehna," "Merkur-Univerzal," "Feroelektro" and "Agrovojvodina" (the firms are given by regions).

The composition of inventories with respect to assortment is given in the following table:

Type of Product, in tons	Producers' Inventories		Distributors' Inventories	
	31 Mar 82	30 Jun 82	31 Mar 82	30 Jun 82
Railroad rails and accessories	915	1,835	--	--
Heavy section steel	7,863	2,485	12,611	3,101
Miscellaneous section steel[1]	22,859	33,913	11,205	18,271
Reinforcing steel	1,037	4,472	2,494	2,267
Rolled wire	6,218	10,015	--	--

Type of Product, in tons	Producers' Inventories		Distributors' Inventories	
	31 Mar 82	30 Jun 82	31 Mar 82	30 Jun 82
Heavy and medium plate and sheet	20,636	12,555	32,202	24,969
Light cold-rolled and hot-rolled sheet	3,190	6,064	1,640	148
Galvanized sheet	1,986	1,453	461	1,210
Hot-rolled strip	5,359[2]	487	282	503
Cold-rolled strip	2,895	3,415	330	1,575
Welded pipe and cold-formed shapes	35,457	32,606	7,184	8,346
Seamless pipe	1,786	888	1,241	1,369
Drawn wire	2,216	2,524	2,091	2,026
Forged steel	175	1,094	1,000	900
Rolled steel wheel rims	182	496	--	--

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[1] Including fine-quality and calibrated steels.

[2] Mainly strip wider than 600 mm.

By comparison with the previous years producers and distributors had smaller inventories of heavy section steel and heavy and medium plate and sheet and larger inventories of other section steel. Inventories were extremely low, in view of the pattern of consumption, for reinforcing steel and cold-rolled sheet. To be sure, the survey of distributors' inventories does not cover the entire distribution network, but only certain major work organizations, but they are nevertheless indicative, especially if one takes into account that the surveys have covered all the main centers of consumption.

On the basis of the figures given we can conclude that the supply of the market was obstructed in the first half of 1982, and this also brought about a greater scarcity of almost all types of rolled and drawn products, particularly for products whose share is high in the pattern of consumption.

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MARITIME SHIPPING OPERATIONS IN 1981

Belgrade TRANSPORT Serbo-Croatian No 6, Jun 82 pp 17-22

[Article by Gordan Matijevic]

[Excerpts] Status and Trends in Capacity of the Yugoslav Merchant Marine

On 31 December 1981 the Yugoslav merchant marine possessed 332 ships with an average age of 16.4 years and total gross registered tonnage of 2,458,311, or 3,813,279 DWT, and 19,004 passenger berths.

Survey of Ship Capacity for the Preceding 3 Years

	Sate of the Fleet			Index
Description	1979	1980	1981	1981/80
No. of ships	339	339	332	97.9
GRT	2,389,233	2,460,240	2,458,311	99.9
DWT	3,701,842	3,806,421	3,813,279	100.2
Passenger berths	17,323	18,635	19,004	102.0

This survey indicates that compared to the preceding year, the number of ships in the fleet declined by 2.1 percent, by GRT by 0.1 percent, while by DWT it increased by 0.2 percent and the number of passenger berths grew by 2 percent compared to the previous year.

In 1976 the fleet contained 322 ships, 2,002,230 GRT, 3,059,557 DWT and 17,331 passenger berths. Thus 1981 showed growth in comparison to 1976, as follows:

By the number of ships, by just	3.1 percent
by GRT, by	22.7 percent
by DWT, by	24.6 percent, and
by passenger berths, by	9.6 percent.

These increases in capacity are very modest in comparison to 1976. Yet the most disturbing factor is the age structure of the ships, which has constantly worsened because of the inability to build new ships, so that today we have more than half the fleet consisting of ships older than 15 years (at the end of 1971 that figure was 38.5 percent, in 1975 it was 47.8 and in 1981, 50.1 percent). That means that the fleet's competitive strength for successful operations is declining, and it has become incapable of visiting certain world ports.

A survey of other elements speaks eloquently of the drastic decline in the amortization capacity of labor organizations in the merchant marine. The insignificant contribution to capital amortization as a ratio of basic capital is very clear, and shows a very worrisome situation, because the funds set aside are below the need for simple maintenance. Thus, for example, in 1974 amortization amounted to 16.1 percent of available basic capital, while 4 years later it was only 3.7 percent and in 1981, 6.4 percent.

The poor amortization record of the merchant marine has led to constantly worsening age structure of the fleet, which hampers operations on world markets, particularly since many countries have adopted regulations against ships entering their ports that are more than 15 years old.

The structure of the fleet by age brackets was as follows:

Age	No. of Ships	%	Gross Registered Tonnage	%
Up to 5 years	45	14.5	703,704	28.6
6-10	34	10.2	358,671	14.6
11-15	81	24.4	726,997	29.6
16-20	56	16.9	287,627	11.7
21-25	62	18.7	301,064	12.2
26-30	32	9.6	36,428	1.5
Over 30	19	5.7	43,820	1.8
Total	332	100.0	2,458,311	100.0

The capacity of ships of less than 11 years of age at the end of 1981 accounted for 43.2 percent of the total merchant marine capacity. In the middle grouping of 11-15 years, at the end of 1981 there was 29.6 percent of total tonnage, while older groups (more than 15 years) still accounted for 27.2 percent of total tonnage.

It is important to stress that the age structure of the ships is becoming worse because of the impossibility of building new ships, so that today we have, as the table shows, more than 50 percent ships 15 years of age or older, and those ships are prohibited from certain ports of the world.

In 1981, according to plan, the merchant marine was to acquire 26 ships. Only 6 were actually acquired, i.e., the plan was only 23 percent fulfilled by the number of ships. Thus the very beginning of realization of the current intermediate plan for 1981-1985 tells us that this plan will experience the same fate as the previous two plans. That was of concern for this branch's development, for the plan indices are in any case modest in that they foresee that by the end of 1985 the fleet will be enlarged by but 8 percent (taking into consideration obsolescence of ships) by number of ships, with an annual growth rate of only 1.6 percent, which is very modest.

Operating Indicators and Economic Effects

a. Transport of Cargo and Passengers

The total transport volume and the share of individual portions of cargo on Yugoslav ships is shown in the following table, in 1,000 tons.

(1) Pravac prevoza	1980.	1981.	(3) Index	(2) Struktura 1980.	Struktura 1981.
Izvoz (4)	1.258	1.226	97	5,1	4,8
Uvoz (5)	6.386	7.655	120	25,7	30,0
Izvoz + uvoz (6)	7.644	8.881	116	30,8	34,8
Tranzit (7)	726	763	104	2,9	2,9
Ukupno preko naših luka (8)	8.370	9.634	115	33,7	37,7
Među stranim lukama (9)	14.066	13.449	96	56,7	52,6
Ukupno međunarodni prevoz (10)	22.436	23.083	103	90,4	90,3
Razvoz (11)	2.368	2.476	105	9,6	9,7
Ukupno prevoz tereta (12)	24.804	25.559	103	100,0	100,0

Key:

1. Direction of shipment
2. Structure
3. Index
4. Export
5. Import
6. Export + Import
7. Transit
8. Total through Yugoslav ports
9. Through foreign ports
10. Total international shipments
11. Distribution
12. Total shipment of cargo

As the above table shows, the total volume of shipments on Yugoslav vessels increased by 3 percent over the previous year. Total international shipments grew by 3 percent, while shipping between domestic ports increased by 5 percent. Export shipments fell by 3 percent, while imports grew by 20 percent, with the share of Yugoslav vessels in our foreign trade increasing by 16 percent. The volume of goods shipped by Yugoslav vessels in transit through Yugoslav ports increased by 4 percent. Taking the overall situation into account, the volume of shipments via Yugoslav ports grew by 15 percent, while the volume through foreign ports fell by 4 percent in comparison with the previous year. In total quantity of goods shipped on Yugoslav vessels, goods from Yugoslav foreign trade accounted for 34.8 percent (compared to 30.8 percent the previous year), while transit goods were 2.9 percent of the total (same as the previous year). Thus the total to and from Yugoslav ports on Yugoslav ships amounted to 37.7 percent (compared to 33.7 percent the previous year) in terms of goods in international trade. Of the total goods shipped between foreign ports, 52.6 percent were shipped (compared to 56.7 percent the previous year). On the basis of this volume of goods in individual shipping directions, international shipping accounted for 90.3 percent (compared to 90.4 percent the previous year) of total cargo carried, and domestic shipping accounted for the remaining 9.7 percent (compared to 9.6 percent the previous year).

The structure of Yugoslav and foreign ships in Yugoslav foreign trade was as follows:

Table 4

(1) Struktura 100 = Ukupno

(5) Godina	(2) Izvoz			(3) Uvoz			(4) Ukupno		
	(6) Svega	(7) Domaći brodovi	(8) Strani brodovi	(9) Svega	(10) Domaći brodovi	(11) Strani brodovi	(12) Svega	(13) Domaći brodovi	(14) Strani brodovi
1977.	100	33,6	66,4	100	25,7	74,3	100	27,4	72,6
1978.	100	39,2	60,8	100	28,2	71,8	100	30,4	69,6
1979.	100	32,6	67,4	100	26,6	73,4	100	27,6	72,4
1980.	100	32,3	67,7	100	28,3	71,7	100	28,9	71,1
1981.	100	36,7	63,3	100	35,4	64,6	100	35,6	64,4

Key:

1. Structure totals 100
2. Export
3. Import
4. Total
5. Year
6. In all
7. Domestic ships
8. Foreign ships
9. In all
10. Domestic ships
11. Foreign ships
12. In all
13. Domestic ships
14. Foreign ships

If we analyze the structure of exports and imports over the past 5 years, we can establish that the Yugoslav fleet still has but a modest amount of our foreign trade by maritime routes. In 1981 shipments of Yugoslav foreign trade goods on Yugoslav ships was greater for exports by 10.3 percent compared to the previous year, while for imports there was an increase of 28.2 percent in 1981. The total shipments on Yugoslav ships for exports and imports grew by 25.1 percent compared to 1980, so that in the overall structure the Yugoslav fleet in 1981 had 36 7 percent of the total (compared to 32.3 percent the previous year, with imports at 35.4 percent (28.3 percent the previous year) and in total export-import shipments, 35.6 percent (28.9 percent the previous year). It can be stated that the share of foreign flags in shipping goods of Yugoslav foreign trade continues to be large.

The total volume of passenger travel (according to data of the Federal Statistical Office) is shown in Table 5:

Table 5.

(1) u 000 din

(2) Vrsta prevoza	1980.	1981.	(3) Index	(4) Struktura 1980.	1981.
Međunarodni (5)	144	154	106,9	2,0	2,3
Unutrašnji (6)	7.157	6.460	90,3	98,0	97,7
Ukupno (7)	7.301	6.614	90,6	100,0	100,0

Key to Table 5:

1. In thousands of dinars
2. Type of travel
3. Index
4. Share
5. International
6. Domestic
7. Total

The total carrying of passengers declined by 9.4 percent; in domestic transportation it fell by 9.7 percent, while in international travel the total grew by 6.9 percent.

b. Convertible Currency Operations

The convertible currency balance of maritime shipping in 1981 is shown in Table 6:

Table 6.

(1)u mil $

(3)Opis	1979.	1980.	1981.	(2) Index 1980. = 100 1979.	 1981.
Devizni priliv (4)	674,8	947,3	1.011,1	71,2	106,7
Devizni odliv (5)	393,4	548,4	607,1	71,7	110,7
Neto devizni priliv (6)	281,4	398,9	404,0	70,5	101,3
(7) Stopa deviznih troškova u %	58,3	57,9	60,0	100,7	103,6
(8) Stopa neto deviznog priliva u %	41,7	42,1	40,0	99,0	95,0

Key:

1. Millions of dollars
2. Index, 1980 = 100
3. Description
4. Convertible currency income
5. Convertible currency expenditures
6. Net convertible currency income
7. Percentage of convertible currency costs
8. Net percentage of convertible currency income.

From the above it is apparent that the total convertible currency income in 1981 grew by 6.7 percent compared to the previous year, while the convertible currency expenditures grew by 10.7 percent, so that the net convertible currency income was up by only 1.3 percent compared to 1980.

Due to increased convertible currency costs, the rate of net convertible currency income growth was reduced by 5 percent compared to last year.

Convertible currency operations improved in 1981 in spite of reduction and slow renovation of capacities and unfavorable conditions for operations in world maritime markets, i.e., there was a fall in tariffs for all activities, as well as a continued increase in operating expenses, which brought a noticeable increase in convertible currency expenditures.

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YUGOSLAV RAILROADS, CONVERTIBLE CURRENCY DEBTS

Belgrade TRANSPORT in Serbo-Croatian No 7, Jul 82 pp 25-27

[Article by Danilo Fogel]

[Text] How Long Shall We Pay Others' Bills?

The Yugoslav railroads realize a convertible currency income of more than $100 million in the convertible currency market areas. This income is earned on transit passengers and goods shipped over Yugoslav rails.

It is essential to note that this convertible currency income is earned by services offered to foreign users. In contrast to exports of goods where a convertible currency effect is achieved only when the goods go beyond Yugoslavia's borders, the railroads realize this income when they offer servces to foreign users on Yugoslav territory. This simple truth frequently causes alarm and misunderstanding.

Specifically, there have been attempts to apply the analogy of exporting railroad services to export of goods mechanically. From that it followed that it was normal for the Yugoslav railroads to collect for their services to domestic users on foreign lines in dinars. As will be seen later, this approach had far-reaching negative consequences for the convertible currency position of the Yugoslav railroads.

Directly connected to this is the method for defining the convertible currency expenditures of the Yugoslav railroads. In practice, in addition to expenses connected to shipping, obligations to foreign railroad for transporting Yugoslav passengers and goods on their lines were also counted as part of the Yugoslav railroads' convertible currency expenditures.

If it were a matter of convertible currency expenditures based on costs related to transport, then it should be part of the railroads' load. These expenses include the following elements:

rental fees for using foreign railroad cars;
damage charges;
memberships in international railroad organizations; and
rebates to foreign shippers, etc.

In 1981 the convertible currency expenditures related to transport totaled $111 million.

These expenditures can be affected by the railroad transport organizations; it could even be said that there are significant possibilities for saving convertible exchange. That is particularly true regarding rental of foreign railroad cars. Approval of the Regulation on Obligatory Unloading Time Limits for railroad cars has sharply decreased use of foreign cars. Here are just a few comparisons:

In the first half of 1982 an average of 10,000 cars

In the first half of 1982 an average of 3,500 cars [translator's note: the dates are the same]

During January and February 1982 the Yugoslav railroads had from 500 to 1,500 more cars abroad than there were foreign cars in Yugoslavia.

If we keep in mind that in 1981 we paid $71 million to rent foreign railroad cars, and that we collected $31 million from foreign railroad companies, we can see clearly that there are $40 million in expenses that could be reduced significantly. This expense could even be eliminated entirely, if the railroads would implement the program for acquiring new railroad cars.

It nevertheless should be said that the effect of the Regulation on Unloading and greater efforts by railroad workers have reduced payments to foreign railroads on this basis. That is shown by the following comparative survey:

Expenditures and Income of Renting Railroad Cars (in thousands of dollars)

	Paid	Collected	Difference	Paid	Collected	Difference
January	4,560.-	2,370.-	+ 2,190.-	3,241.-	2,117.-	+1,124.0
February	4,929.-	2,363.-	+ 2,566.-	3,686.-	2,520.-	+1,166.-
March	7,035.-	2,822.-	+ 4,213.-	4,194.-	2,742.-	+1,452.-
April	5,192.-	2,602.-	+ 2,590.-	2,799.-	3,540.-	- 741.-
May	4,245.-	2,089.-	+ 2,156.-	2,114.-	2,109.-	+ 5.-
June	4,549.-	1,681.-	+ 2,868.-	2,503.-	1,988.-	+ 535.-
Totals	30,510.-	13,927.-	+16,583.-	18,537.-	14,996.- [sic]	+3,541.-

Thus in 6 months a saving of $13 million was realized. The railroad transportation organizations only enjoyed dinar effects, however, because the convertible currencies were used to pay expenses of shipping on foreign rail routes.

The other part of the convertible currency expenditures, which the Yugoslav National Bank still treats as an obligation of the railroads relates to passengers and goods for import and export that are shipped on foreign railroad routes. In order to perceive the volume and complexity of the problem, one must have the following data in mind:

(Categories of Transportation Service) (in thousands of dollars)

	1979		1980		1981	
	obligation	Net convertible currency income	obligation	Net convertible currency income	obligation	Net convertible currency income
passengers	28,615		25,296		20,773	
goods for export	86,206		41,291		39,310	
goods for import	23,735		89,137		81,991	
total	138,556	102,254	155,724	98,440	142,074	104.411

The years reviewed were not selected at random; rather, it was determined that in 1979, passengers and the economy created greater convertible currency obligations than the total net convertible currency income of the railroads.

Yet this fact in itself would not have led to the situation in which the railroads found themselves regarding payment of debts to foreign railroads. The real problem arose as a result of the closing of the convertible currency market in the spring of 1980.

All Yugoslav users of services on foreign routes paid their fees in dinars. Until the spring of 1980, the railroads could buy the necessary foreign exchange to pay to foreign railroads, to pay off their international credit, buy spare parts, etc. During that period it was of no practical importance that the convertible currency obligations created by passengers and the economy were treated as an expenditure of the railroads.

With the cessation of operations by the convertible currency market, the railroads were put in the position of needing to pay obligations created by others out of their own convertible currency income. And since those obligations were greater than the income, debts to foreign partners began to accumulate, until in June, 1982, the debt reached $55 million.

This indebtedness has negative effects chiefly in two directions:

First, there are warnings and reminders, leading eventually to demands by individual railroads that are creditors, payment of high protracted interest and damage to the high reputation that the Yugoslav railroads enjoy abroad;

Second, the railroad is regarded as the bearer of these debt conventions and, according to the 1982 Law on Handling Convertible Currency, the railroad organizations are generally treated as convertible currency deficit operations. In practical terms, that means that they cannot get approval for using convertible currency to buy spare parts until they pay off these conventional obligations. The degree to which that causes increased immobility of train resources is a theme of its own, which while not the subject of this consideration, nonetheless should not be ignored.

Here we should stress that the Community of Yugoslav Railroads has sought separate solutions for the convertible currency obligations created by passengers and those based on shipments of goods. It is very important to stress that passengers will continue to pay for their tickets on international routes at stations in Yugoslavia in dinars. This is a matter of an international convention that the Federal Executive Council ratified and which it does not intend to revoke. As far as convertible currency obligations based on this are concerned, they should be covered by the self-management interest communities of republics and provinces for economic relations with foreign countries, as stipulated by the Federal Executive Council Resolution of 10 June 1980.

By this we do not want to claim that this means of paying to the railroads is without problems. On the contrary, from 1980 to the present, only the Bosnia and Hercegovina self-management interest community for economic relations with foreign countries has made payments, totaling something more than $1 million.

During the same period, passengers have incurred more than $50 million worth of obligations in this way.

It is important, however, that that will have no impact on the rights of passengers in the future to buy railroad tickets for foreign countries in dinars.

It is, however, realistic to ask whether we should continue to issue return tickets from abroad, since that is not stipulated by the indicated convention. This topic should eventually be considered by the appropriate agency of the Community of Yugoslav Railroads.

In any case, the problem of shipments of goods has much greater dimensions. After the closing of the convertible currency market, the cited Federal Executive Council Resolution (popularly known as "Resolution 704") was approved; it took effect on 10 July 1980.

This Resolution stipulated that users of transportation on foreign routes must pay in dinars for railroad services at the time of dispatch or delivery of cargo. Further, users are obliged within the period of 1 month to pay to the railroads in convertible currency the amount of expenses for transportation on foreign routes, at which time the railroads are to return the corresponding amount in dinars. This complicated manner of payment was stipulated to overcome the legal obstacle that provides that payments between domestic parties may only be made in dinars.

The implementation of this Resolution was not even approximately satisfactory, as seen from the following comparison:

Obligations for shipment of goods:	$327,179,000
Paid by users:	49,355,000
Percentage	15.09

If we consider individual railroad transportation organizations, then we must stress that the best situation regarding convertible currency collections was at the ZG Ljubljana [Ljubljana Railroad organization], the Railroad Transportation Organization Skopje and the Railroad Transportation Organization Zagreb.

Yet despite energetic measures and great efforts by railroad workers in these organizations as well, they have not succeeded in paying even 25 percent of their total obligations for shipping goods on foreign tracks.

Despite nearly $50 million from users and a portion of the capital held in convertible currency reserves from 1980 until today, a debt of $55 million remains.

During the same period the railroads paid $156 million from their own income for transporting passengers and goods on international routes.

This Resolution was insufficiently effective because it could not foresee the necessary sanctions for failing to honor its provisions, while it made it possible for the railroad stations to negotiate with the users, not to insist vigorously on applying the Resolution. Besides that, the objectively difficult convertible currency situation of most users also promoted neglect of the Resolution. Users were obliged at the time of importing to provide for convertible currency for transportation on foreign routes, but as a rule they used this convertible currency to make purchases abroad. The exporters were also obliged to provide convertible currency for their transportation costs, but in most instances this part of convertible currency income was retained at their labor organization, so that some even collected for incentives based on that portion of income.

The Community of Yugoslav Railroads in the first place insisted on accepting the stand in principle that shipments on foreign routes constituted services of foreign railroads, so that the Yugoslav railroads were merely acting as collecting agents for the foreign provider of services.

At the same time, the Community of Yugoslav Railroads advocated the constitutional and legal right of associated labor on the railroad, within the framework of positive regulations, to possess convertible currency income as an inherent part of its own income. This principle could not be brought to force because the Yugoslav railroads have an "accounts current" relationship with foreign railroad administrations, so that debt payments on the basis of transportation is limited to 80 percent of the total convertible currency income of the Yugoslav railroads. So that there be no misunderstandings, this sort of accounting is carried out on the basis of international conventions, which remain in effect. The problem can be resolved only if the domestic users pay in convertible currency for their shipments on foreign routes.

Therefore, the only way out of this situation would be the approval of a regulation that would create realistic prerequisites whereby everyone would pay their own foreign exchange obligations.

In seeking to find solutions for the convertible currency problems it has encountered, the Community of Yugoslav Railroads has received the full support of the Federal Committee for Transportation and Communications, so that finally the Federal Executive Council approved the "Regulations on Conditions Under Which a Legal Party Can Utilize and Pay for Transportation Services Provided by a Foreign Railroad in International Rail Traffic."

This Regulation finally made official the position that services on foreign tracks are not services of the Yugoslav Railroads. It also prescribed sanctions for failure to abide by it and, which is very important, obligated the National Bank to prepare directions for its implementation.

It remains for the railroad transportation organizations to abide by this Regulation conscientiously, for only in that way can the railroads recover all the rights they should have according to regulations in effect concerning the Yugoslav convertible currency system.

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BRIEFS

INVESTMENT IN AGRICULTURE--Of the 155 billion dinars which have been planned for investment in agriculture up to 1985, 121 billion are earmarked for fixed assets in the socialized sector of agriculture. According to the draft agreement accepted by the executive council of the Association of Banks of Yugoslavia, banks would invest 48 billion of the 121 billion dinars, or 12 billion dinars annually based on 1980 prices. Priority will be given to credits for basic agricultural production, as well as for the purchase of 250,000 hectares of arable land. [Excerpt] [Belgrade EKONOMSKA POLITIKA in Serbo-Croatian 18 Oct 82 p 29]

SLOVENE-KOSOVO JOINT PROJECTS--Up to now economic enterprises in Slovenia have signed seven self-management agreements with the Kosovo economy valued at more than 1.3 billion dinars. Agreements pertain to the production of electric motors for compressors in Djakovica, the bismuth salt production plant in Prizren, the radiator plant in Gnjilane, the reinforced polyester [products] plant in Podujevo, the insulation materials plant in Pristina, and other projects. These plants will open up about 1,500 new jobs. In addition to examining 38 new ideas for income-linking of the two economies, the meeting on Wednesday of the Slovenian delegation led by Vinko Hafner, and the Kosovo delegation under Ilija Vakic discussed some objective problems and subjective weaknesses which were slowing down the process of pooling labor and resources [of the two areas]. Objective circumstances have brought about the lack of funds, especially foreign exchange, the impossibility of importing raw materials and equipment, etc. The delegations also discussed the position of Slovenian specialists in Kosovo and the approximately 8,000 Albanians working in Slovenia. Additional efforts should be made, it was said, so that these workers become an integral part of the working class of Slovenia, because they are known as valuable and industrious workers yet they feel quite isolated in this area. Slovenian specialists, on the other hand, do not have much interest in going to Kosovo.... [Excerpt] [Zagreb VJESNIK in Serbo-Croatian 28 Oct 82 p 12]

INA OIL PRODUCTION--In November and December more crude oil and oil products will be available than was the case in October, according to Petar Flekovic, president of the INA (Petroleum Industry of Zagreb) business council. Flekovic said INA will process only 306,000 tons in October, instead of the 800,000 tons planned; 260,000 of the 306,000 tons are from its own production, while 46,000 tons are transitional reserves from September imports. In November and December INA will make available 1,170,000 tons of crude oil from its own production and from imports from the convertible-currency and clearing-account areas, or 90 percent more than that available in October which was the worst month this year. In the first 9 months of this year INA processed 86 percent of its share of Yugoslav oil production, Naftagas of Novi Sad processed 97 percent of its share, and Energopetrol of Sarajevo processed 102 percent of its share. In the last quarter of this year INA will process 81.8 percent of its share, Naftagas 95 percent, and Energoinvest 95 percent of its share. This shows that INA will not meet the plan but this is because the Law on the Obligatory Allocation of Foreign Exchange (whereby INA was to have received 17 percent of the allocation) has not been applied and because of the situation in the Privredna Banka (Economic Bank) of Zagreb. This year INA will process a total of 6,740,000 tons of oil, including 3,046,000 tons from its own sources (45 percent), 2 million tons from USSR (30 percent), and 1.7 million tons from the convertible currency area (25 percent). In November INA is scheduled to get 618,000 tons of crude oil; 35,000 tons by tanker from the USSR about 6 November, another 148,000 tons from the USSR on 15 November, 85,000 tons from Libya in the middle of the month which is being paid in cash, and 90,000 tons by 29 November from Iran based on "kompensacije" [clearing or other payment arrangements]. In addition to this, 260,000 tons of oil will be available from our own sources. [Excerpts] [Zagreb VJESNIK in Serbo-Croatian 30 Oct 82 pp 1, 10]

CROATIAN EMPLOYMENT PLANS--Considering the declining tendency in production, the slowed increase in employment can be expected to continue, so by the end of the year about 100,000 persons are expected to be looking for jobs, 80,000 of which would qualify as definitely unemployed according to the criteria of the Social Agreement on this. Next year a 2-percent increase is planned for employment in the socialized sector, despite all difficulties. This means that about 59,000 workers could be employed (29,000 in newly opened jobs and 30,000 in vacated positions). A somewhat faster increase in employment is expected in the private sector, namely, 4 percent with 3,500 newly employed; but this will still not meet the social plan for the 1981-85 period. In 1983 a total of 62,500 workers are expected to be employed, in addition to about 50,000 seasonal workers. About 172,000 are expected to be seeking work during 1983 (namely, 100,000 unemployed at the end of 1982 and 47,700 youth who will be entering the labor market upon completion of school, as well as 5,000 returnees from abroad, 9,300 who will leave the agricultural sector [and move to cities], and 10,000 from other republics. The planned increase would enable employment of the entire new generation of workers [youth], so about 105,000 [remaining persons] would be registered as unemployed and by the end of the year this figure would be 109,500. Because of reduced investments and problems of work organizations operating with losses, and the lack of rehabilitation programs [for the economy in Croatia], there will be difficulties in employment, despite the fact that there will be a lack of people in certain branches such as the metals industry and shipbuilding. Although 92,490 were unemployed as of the end of August this year (15.2 percent above last August), only 74,798 were considered unemployed according to the criteria of the Social Agreement; 42,140 were seeking work for the first time, 47,680 were female; and 60 percent of the 92,490 were under 25 years of age. [Excerpt] [Zagreb VJESNIK 28 Oct 82 DELEGATSKI VJESNIK supplement p 11]

MORE RAIL PASSENGERS--According to Zivojin Gotic, head of the transport organization service of the Yugoslav Railroad Association, the Yugoslav railroads are expecting that the number of passengers will increase by at least 15 percent, but that the railroads are prepared to accept all passengers even above this expected increase, as a result of the shortage and limits set on consumption of oil derivatives for road vehicle transport. The railroads have already worked out a program for this, he said. It is, above all, necessary that rail car plants and plants for repairing cars speed up production and repairs. An average of 20 to 25 percent of all passenger cars are out of use because of breakdowns, lack of spare parts, etc., but on some days and in certain railroad work organizations as many as 50 percent are out of use. By 1985 600 new passenger cars are planned to be built, but there is little expectation that this will be achieved. Up to now the Zagreb Railroad Transport Enterprise has contracted [to supply] the most cars, namely, 138, and these cars will certainly be delivered to the Yugoslav Railroads. Special groups of workers and specialists are being prepared to handle emergency repair of cars and locomotives; these groups will work as "flying teams," moving throughout the system repairing passenger cars and eliminating the need to send cars to repair plants. There is also the possibility that the West German railroads will lend a large number of passenger cars for international travel [by guest workers] for the upcoming holidays, i.e., Republic Day and New Year, but also because rail passengers are increasing from day to day. It is possible that the West German railroads will ship a certain amount of transit freight on the Yugoslav railroads, making it possible to thus earn foreign exchange from which we could pay for leasing passenger cars. Gotic also said the possibility was being examined of increasing the number of trains capable of transporting automobiles, of which there are now 17 in the whole system. [Excerpt] [Zagreb VJESNIK in Serbo-Croatian 2 Nov 82 p 3]

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